AN HBJ PUBLICATION

October 1983/$2.00

WEEDS TREES & TURF

The Magazine of Landscape and Golf Course Design, Construction and Care Since 1962

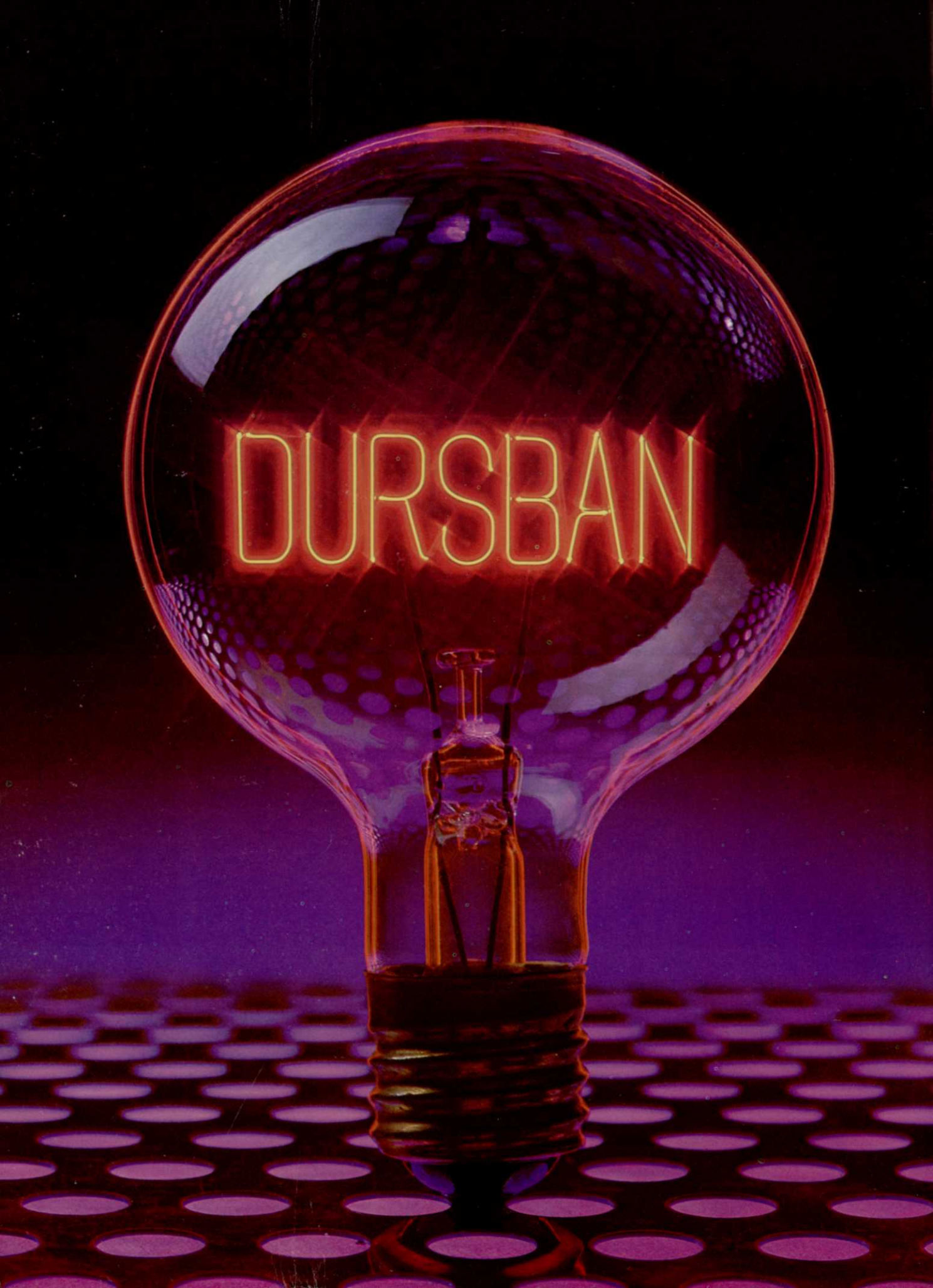
Government Cutbacks Force Increased Efficiency

Landscape Management at the U.S. Naval Academy

Turf Seed Yields Off One Third, Shortages Likely

Combines, normally busy in summer, sit on edge of wet seed field.

Part 1
FERTILIZER GUIDE
For Turf and Trees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DURSBAN

The best idea in bug control.

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3921

Circle No. 109 on Reader Inquiry Card

WT&T

Cover: Combines sit idle on side of a soggy seed field in Oregon this summer. Seed yields are down as a result of the rain. Story on page 22.

OCTOBER 1983/VOL. 22, NO. 10

Unjamming combines in Oregon. See page 22.

Introduction to fertilizers. See page 26.

U.S. Naval Academy Common. See page 48.

22
The Soggy Seed Harvest of 1983

It looked like a bumper crop when seed growers cut and windrowed their crop this year. But then the rain started and didn't stop for weeks. The crop is not a bumper one any more.

26
Fertilizer Guide: Part One, What They Are And How They Work

The first of three articles by Drs. Funk and Rathjens of Davey Tree Expert Co., describes in detail the fertilizer products on the market today and how they work. This Guide includes tips to fertilizer burn prevention, symptoms of fertilizer problems, and what is in store for the future. Next month will feature tips for applying turf fertilizers and December will focus on fertilization of trees and shrubs. Don't miss any of this three-part series.

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Cutbacks Force Increased Efficiency For Government

Weeds Trees and Turf survey shows staff sizes and budgets for government landscape managers are falling or frozen while work loads increase. Government landscape managers are forced to turn to more efficient equipment and chemicals to get the job done with the resources at hand.

46
Salem Enlists Neighborhoods To Keep Budget in Line

Frank Bellinghausen is lucky. Neighborhood groups are taking on some of the work eliminated by regular cutbacks in budget and personnel. Salem, Oregon, has thus earned the title Tree City USA seven times.

48
Cusimano Navigates Protocol at Anapolis' U.S. Naval Academy

The U.S. Naval Academy is home for 4,500 cadets, thousands of tourists, and many visiting dignitaries because Bill Cusimano makes it that way. Working within the protocol of the military, Cusimano plans ahead to keep the military on schedule and prepared for anything.

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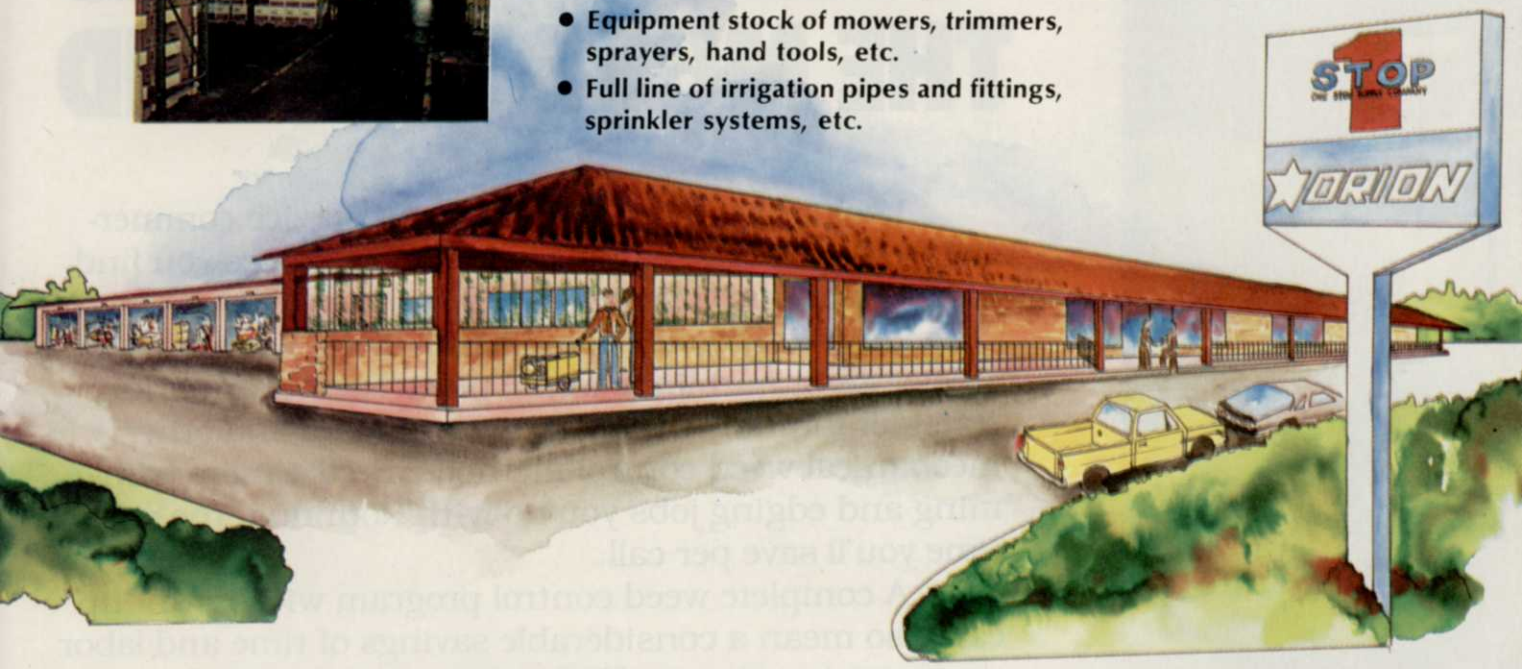

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OUTLOOK

By Bruce F. Shank, Executive Editor

Seed Country: Working long days adds up to better turf for everyone

The usually sleepy Northwest, seed country to us, is buzzing this summer. Between the rain, field burning and a rash of personnel changes, seed country is more like Wall Street than small towns surrounding grain elevators.

Harvest time is always tense. Everyone works long days driving combines and trucks, processing seed at the cleaning plants, and torching fields when the state says it's alright to burn.

Seed growers like Bill Rose, Willard McLagen, and Dave Dorfler begin each day at 7 a.m. breakfast meetings with their foremen. They are constantly in touch with their crews by radio as the harvest progresses.

The state might tell a grower he has two hours to burn a 300-acre field. The grower must quickly round up enough people from other operations to drive water and torch trucks, much like a volunteer fire department. There are few complaints about helping out. The days are long and the work is hard, but pitching in is a part of life in Seed Country.

Things were rushed evenmore this year because two valuable weeks of time were lost to rain. Suddenly, unsold seed from last year's harvest, which threatened to drive the price of this year's crop down,became the surplus needed to cover this year's potential losses from the rain.

Right in the middle of all this excitement, the editors of Weeds Trees & Turf show up, asking a bunch of questions and taking lots of pictures. Some people might have told us to get out of the way or come back later. Not the seed people. They asked us to join them at breakfast meetings, in their trucks as they burned fields, at their cleaning plants in full operation, and after a long, hard day for a barbeque. We did it all and felt fortunate to be in the middle of the nerve center of the seed industry.

If they'd make time for us, they'd make time for you too. That's the kind of people they are.

So, next time you buy seed, you might think of it as more than just seed, but a product from a friendly bunch of people working hard to make your turf look as good as it can. **WTT**

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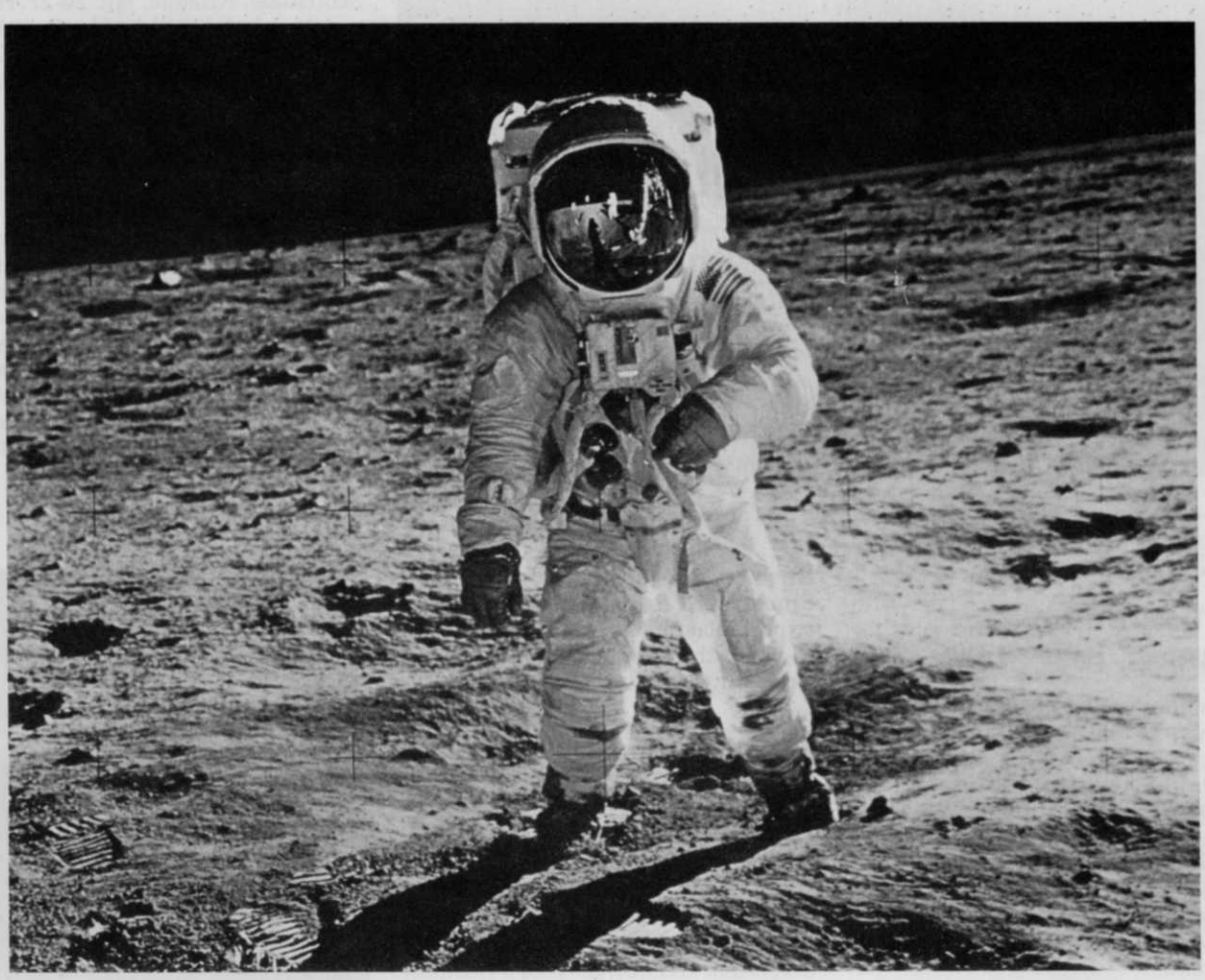

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A few do.

Pennfine Perennial Ryegrass covers more ground than any other turfgrass variety in the world. This message recognizes the people who made it happen.

For your free full-size (22" x 28") poster of this ad, send your name and address to:
Pennfine Poster # 4, P.O. Box 923, Minneapolis, MN 55440. (Watch for the other five ads in this series.)

Circle No. 123 on Reader Inquiry Card

GCSAA simplifies show travel plans

The Golf Course Superintendents Association of America has chosen Sunflower Travel Agency as the official travel agency of the Las Vegas Conference and Show, Jan. 28 to Feb. 3, 1984. Designation of the agency helps showgoers obtain lower airfares for the show, tournament beforehand, and post-conference travel.

The golf tournament will be held in Scottsdale, Arizona, Jan. 26-27. Headquarters hotel will be the Scottsdale Raddison Resort and Racquet Club. The men's tournament will be played at McCormick Ranch Golf Club. The ladie's will play Orange Tree Golf Club.

The preconference seminars start in Las Vegas Saturday, Jan. 28. The trade show opens on Tuesday, Jan 31. The banquet takes place Thursday evening, Feb. 2. The MGM Grand is the headquarters hotel in Las Vegas. The deadline for early registration discounts is Dec. 31, 1983. Registration packets were mailed in early September. Interested persons should contact GCSAA, 1617 St. Andrews Drive, Lawrence, KS 66044.

SEED

Firms trade players in sales, research

A chain reaction of management changes at the major turf seed companies, starting in early August, continues at press time.

First Mike Robinson, product and marketing manager at Pickseed, left to create his own research and marketing company. Then Steve Tubbs of Loft's Great Western Seed Co. was replaced by Dick Olson of E.F. Burlingham.

Next Gerald Pepin, International Seeds research director and owner of many turf seed patents, moved over to Pickseed. Van Engelen Beheer, Holland, purchased seed grower Willard McLagen's 50 percent interest in International Seeds Inc. in late July. J.L. Carnes, president of ISI retains a 50 percent interest in the company. Van Engelen, a division of Cebeco-Handelsrad of Rotterdam, is one of the oldest European marketers and breeders of turf and forage grass varieties.

These changes leave two seed management positions open, one at Burlingham and one at International. Since there is a limited number of experienced managers of turf seed, it is likely the chain reaction will continue for the next few months.

NURSERIES

AAN's Lederer predicts fall surge in sales

In a special report to the American Association of Nurserymen Board of Directors, Executive Vice President Robert F. Lederer said that important financial and economic indicators are clearly pointing to a potentially strong turnaround for sale of living plants this fall season. In his report, he urged the Board to call on the industry to prepare for a big fall season and to take steps now to help make it happen.

"Plant product retailers should stock up on plants and supplies to make certain that as the turnaround builds, the industry is fully prepared to capture those sales," Lederer said. "Good fall weather coupled with the vastly improved economy could very well makeup for spring losses."

Robert F. Lederer

The primary cause for the weak spring season was the unusually poor weather.

"If we get reasonably good weather this fall, the market will rebound with great strength," Lederer said.

He also suggested that the retail industry begin now with aggressive advertising and promotion programs to help stimulate demand for the fall season.

Make sure you're there when hundreds of lawn care professionals meet to take part in the green industry event of the year...

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PLCAA Conference & Show Indianapolis / Nov. 8-10

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KEYNOTE ADDRESS

THE LAWN CARE INDUSTRY: PAST, PRESENT, AND FUTURE

JACK VON FOSSEN, President, Chemlawn Corp.

EARLY BIRD REGISTRATION AND RECEPTION

Make plans to arrive Monday, November 7th, and take advantage of the Early Bird Registration and Reception Theme Party (6:30 PM to 8:30 PM). Pick up your badge and convention packet and be ready to go Tuesday morning when the Show opens.

THE TRADE SHOW

The Indiana Convention—Trade Center plays host to a super display of lawn care equipment, suppliers, and manufactures. See the latest that the industry has to offer, and enjoy the unique "Specials" that several exhibitors are offering this year.

WORKSHOPS

A panel of green industry experts has been assembled to conduct shirt-sleeve workshops focused on management techniques that boost the bottom line:

BETTER MANAGEMENT FOR SINGLE BRANCH OPERATIONS.

BETTER MANAGEMENT FOR MULTIPLE BRANCH OPERATIONS.

SEMINARS

Here is a partial list of this year's exciting lineup of speakers and topics:

GOVERNMENT REGULATIONS: A CLEAR AND PRESENT DANGER

RAY RUSSELL, Director, Government Relations, Dow Chemical Co.

ORGANIZING AT THE LOCAL LEVEL: OUR MOST URGENT NEED

IAN OPPENHEIM, Executive Director, Rational Approach to Pesticides, Inc.

NEW AGRONOMIC ISSUES FOR THE LAWN CARE INDUSTRY

JOE VARGAS, Michigan State; JACK HALL, VPI; CHUCK DARRAH, Chemlawn Corp.

NEW IDEAS IN EQUIPMENT FOR THE LAWN CARE INDUSTRY

...A review by industry representatives

CUSTOMERS, COMPLAINTS AND CANCELLATIONS

YOUR CUSTOMERS AND HOW THEY PERCEIVE YOU: RESULTS OF A RECENT MARKETING STUDY

CAROL SCOTT, The Barickman Company

COMPLAINTS: FROM WHENCE THEY COME

ALLAN DUEY, President, Jay-Lan, Inc.

SAVING THE CANCELLATION: A FEW SUGGESTIONS

John Kenney, President, Turf Doctor

THE NEGATIVE OPTION TIME BOMB

L. D. ANDERSON, President, Fertilawn, Inc.; J. MARTIN ERBAUGH, President, Lawnmark/Div. Erbaugh Corp.

THE IMPORTANCE OF RESEARCH AND ITS APPLICATION TO KEEP YOUR COMPANY GROWING

AL TURGEON, Vice President, Research, Tru-Green Corp.

STAYING LIT WITHOUT GETTING TORCHED: STRESS MANAGEMENT

TOM JADIN, Director, Winnebago Mental Health Institute

TIME IS RUNNING OUT...SEND IN THIS ADVANCE REGISTRATION FORM AND SAVE!

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	Advance	On-Site
PLCAA Members:	$ 60.00 (per per.)	$ 75.00 (per per.)
Non-Members:	$100.00 (per per.)	$115.00 (per per.)
Spouse/Student:	$ 20.00	$ 25.00
Ladies Program:	$ 10.00	$ 10.00 (Wed., Nov. 9)
One Day Registration:	Members - $30.00	Non-Member - $45.00

*Advance Registrations accompanied by a PLCAA Membership Application and dues payment may register all representatives as members if received by October 24, 1983.

Amount Enclosed $_____ Make checks payable to P.L.C.A.A.

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NOTE: (1) Any cancellation MUST BE in writing. $10 non-refundable. No refund given after November 1, 1983. (2) Advance registrations will not be acknowledged after October 24, 1983. (3) Hotel reservation cards must be sent directly to the Hyatt or Hilton (overflow). Reservations with the Hyatt MUST be received by October 13, 1983.

GOLF UPDATE

ABA defers membership ruling

After a five month nationwide campaign by the National Club Association to protect the private social rights of judges, the American Bar Association House of Delegates has deferred action on a resolution that would make it "inappropriate" for judges to belong to private organizations with alleged selective membership policies.

Resolution 119, sponsored by the ABA Committee on Ethics and Professional Responsibility, seeks to amend the ABA Code of Judicial Conduct. Judges would be banned from maintaining memberships in private, social, civic, service, fraternal and sororal groups which practice "invidious discrimination." According to the Committee report, these memberships "may give rise to the perceptions by minorities, women and others, that the judge's impartiality is impaired." The term invidious discrimination proved to be a trouble spot. It was never clearly defined within the resolution.

In the end, the ABA Delegates agreed to defer consideration of the resolution until its next meeting in Feb. 1984.

McLoughlin settles prior to trial

James McLoughlin, recently resigned executive director of the Golf Course Superintendents of America, will not have to face a jury for alleged gambling violations due to an arrangement his lawyer worked out with the judge in Lawrence, KS, in August.

McLoughlin said earlier he would fight the charges against him, but chose instead to accept good behavior conditions which could prevent charges being recorded. A trial would have required testimony from many GCSAA staffers and board members, a great inconvenience. The arrangement sets a period of time for "good behavior" with the result of charges being dropped. Since McLoughlin lives in New York, and both McLoughlin and the association would like to put this situation behind them, the judge agreed to the special arrangement.

McLoughlin tendered his resignation the end of May, citing the Association's two-year delay in relocation and the need to be closer to his family in New York, as reasons for leaving. McLoughlin's directorship had always been riddled with controversy. The press for relocation, alleged gambling violations and financial condition of the GCSAA weighed heavily in the Executive Committee's decision to accept McLoughlin's resignation. John Schilling, formerly in charge of marketing for the annual conference and Golf Course Management magazine, has been named associate executive director. The Executive Committee is studying requirements for the top post.

Cheeseman leaves turf for teeth

Jerry Cheeseman, the driving force of the Lake City Community College, FL, School of Golf Course Operations, will leave the teaching ranks to enter the student ranks at the University of Florida school of dentistry.

Cheeseman was also director for the Lake City Community College School of Landscape Design and Sales. Cheeseman was very active in state and national golf organizations and was responsible for making the small community college a sought-after school by students from across the country.

NEWS *from page 8*

NURSERY

AAN says goodbye to 230 Southern Bldg.

After 45 years in the same location, the headquarters of the American Association of Nurserymen has moved. Its new address, effective Aug. 22, is 1250 Eye St. NW, Suite 500, Washington, D.C. (202) 789-2900.

"With the uncertainty of the future of the old building we were in and with the tremendous incentives we received from the owners of the new building, we decided the time to move was right," said AAN Associate Manager Larry Scovotto.

The Association had been considering building its own headquarters for the past year-and-a-half, but the economy and prohibitive cost of building in the Washington, D.C. area curtailed those plans. Incentives at the new building included seven months free rent and $70,000 in improvements, suited to the needs of the AAN.

TREES

NAA picks Las Vegas for February meeting

The National Arborist Association will have its 47th Annual Meeting at Caesar's Palace in Las Vegas Feb. 12-17.

Although the entire agenda of the meeting has not been finalized, it will focus on management. Las Vegas was selected in keeping with the Association's policy of moving the Annual Meeting from East to West on alternate years.

SOD

Pacific Sod likes its old name best

Pacific Green/Nunes and Pacific Green has returned to using its original name, Pacific Sod, and has completed an internal reorganization, according to Richard Rogers, president.

Pacific Sod, founded under that name 15 years ago, is one of the West's largest commerical sod growers.

"The reorganization allows us to position ourselves in order to quickly expand our operations to meet anticipated increased demands for the balance of 1983 and 1984," said Rogers.

Rogers said the decision to resume

continued on page 14

FOR A BEAUTIFUL, RUGGED, LOW MAINTENANCE TURF, YOU CAN'T BEAT FALCON!

"Falcon is unbeatable for beauty and toughness. I've never seen anything like it."
STEW PALMER
Chem Lawn Corp.

PENNANT...TOP PERENNIAL RYEGRASS IN THE SUNBELT!

	Poor — Best
PENNANT	
PENNFINE	
DIPLOMAT	
YORKTOWN II	
MANHATTAN	
CITATION	

Warm and cool season average turf score, Southern California first-year tests, 1979.

PENNANT	7.7
PREMIER	7.3
REGAL	6.3
CBS	5.7
DERBY	5.5
ANNUAL	2.3

Average Turf Performance scores, February 1980. Southern Arizona turf overseeding on Tifgreen Bermuda. Sixteen entries seeded October 1979. (10 = Best).

Two proven performers from E.F. Burlingham ... Falcon Tall Fescue and Pennant Perennial Ryegrass!

Falcon was developed to produce an attractive, more persistent turf with finer texture, darker color and higher density than other varieties of tall fescue. Falcon shows quick germination, seedling development and good tolerance to warm conditions in the transitional zone. Plus, Falcon offers improved resistance to brown patch and net blotch compared to other tall fescues.

In recent tests throughout the Sunbelt, Pennant topped many of its competitors in overseeding and heat tolerance trials. Pennant was also found to maintain its excellent turf color and quality late into the season. Pennant's rich, moderately dark green hue, fine leaf blades, and improved mowing properties make it a true champion.

For more information contact:

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Circle No. 103 on Reader Inquiry Card

The grass along the fence in the photo at left was killed with a fast-acting systemic post-emergent herbicide. Obviously, no professional groundskeeper could abide this ugly mess, so the dead vegetation has to be removed with expensive hand labor. The systemic product is recommended for lawn renovation so, naturally, vegetation will grow back as new seeds germinate, resulting in an endless cycle of retreatment, ugly dead vegetation and more hand labor. Clean up a fence line with Dyclomec and vegetation will never again be a problem, because an annual pre-emergent application of Dyclomec will form a vapor barrier and keep the area absolutely clean.

Dyclomec turns Problem Areas into Beauty Spots

. . . and the vapor barrier eliminates repeated investment of hand labor to clean out dead vegetation.

Dyclomec is surely the most efficient herbicide that has ever been offered to professional landscapers. In fact, it is called the *landscaping herbicide*.

Now, at last, the groundskeeper can easily and economically achieve that manicured look, which consists of contrast. Of sharply defined areas where immaculate turf is contrasted with areas of beautiful, naked earth. Where ornamentals grow in an area of beds that are free of any distracting growth.

Until the advent of Dyclomec, such pristine landscaping could only be achieved with repeated investments of hand labor to clean out dead vegetation resulting from an endless cycle of regrowth and retreatment with a systemic herbicide.

But once an area has been cleaned up with Dyclomec, hand labor to remove dead vegetation will never again be necessary because an annual application of Dyclomec will keep the area absolutely clean. How is this possible?

On the page at the right are step-by-step illustrations of how Dyclomec works. Understanding its principle will help you discover the many labor-saving, money-saving ways it can help you in landscape maintenance.

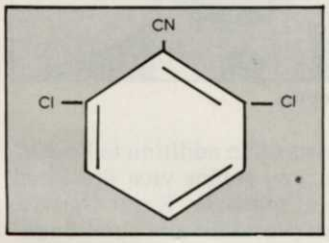
We urge you to read it carefully and call us toll free if you have any questions.

Dyclomec Applicator for Uniform Distribution

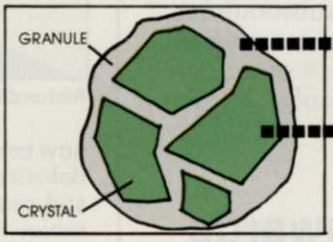
Because proper distribution of Dyclomec is important, this patented Acme Spred-Rite® G Spreader is the ideal tool. Granules are gravity-fed through deflector spikes that give a uniform pattern. Hold the head high for a wide swath; lower for a narrow swath; remove it for the finest line of control. Regulate flow with interchangeable orifice disks. Spreads any granular material. Lightweight. No moving parts.

Dyclomec with its pre-emergent and post-emergent action is ideal for vegetation control in mulch, or bark around roses and ornamentals, or in flagstone and gravel walkways. It works its way down to the ground and forms a vapor barrier which provides season-long weed control and maximum safety to desirable plants.

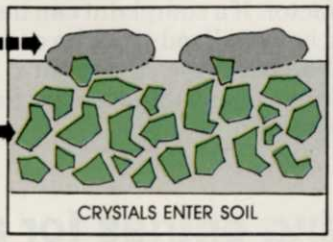
How Dyclomec controls weeds without harming ornamentals:



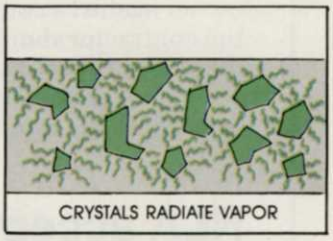
1. Dyclomec is a 2,6-dichlorobenzonitrile, commonly known as Dichlobenil. This unique herbicide goes directly to a vapor stage without going through a liquid stage. It is activated by temperature and soil moisture.



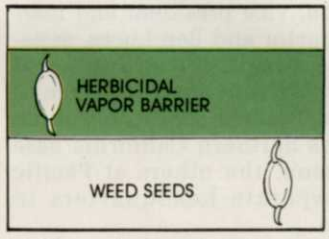
2. This remarkable herbicidal compound of razor-thin crystals is uniquely processed by PBI/Gordon to make a precise granule.



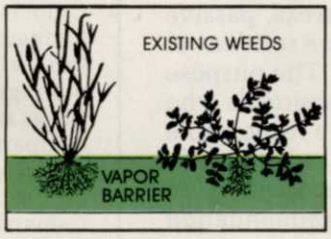
3. Granules are spread on soil surface. Moisture carries the Dyclomec crystals into the upper layer of soil. Because of adsorption by soil particles, lateral movement is minimal.



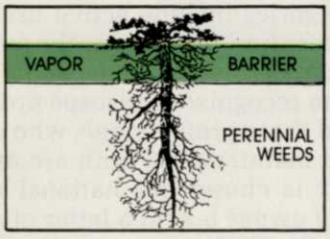
4. Temperature and soil moisture activate the Dyclomec crystals and they begin to radiate a herbicidal barrier. This continues for an entire growing season, and the spent crystals disappear, leaving no residue.



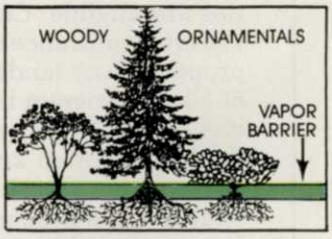
5. In this vapor barrier no plant cell division can occur. Seeds trying to germinate in the barrier will die. Sprouts below this zone will be killed as they try to penetrate the barrier.



6. Existing vegetation such as shallow-rooted grasses and annual weeds having root structures in this barrier will likewise be affected and die after two to three weeks.



7. Certain perennial weeds coming out of dormancy and attempting new growth within the Dyclomec barrier will run into the same dead end: they will be killed by the vapor.



8. Dyclomec, when used as directed, does not affect woody ornamentals, shrubs and trees that have deep roots extending well below the herbicidal vapor zone.

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Dyclomec 50-lb. bag not available in Washington, Oregon, Idaho; Neither size is available in California.

Call Gordon's Technical Service Department

If you have any questions about where and how to use Dyclomec, we invite you to call us. Our technical people have a combined experience of 95 years in working with the Dyclomec chemical.

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Circle No. 122 on Reader Inquiry Card

LANDSCAPE UPDATE

CLCA forms review committees

A series of blue ribbon Professional Review Committees are being set up in the 19 chapters of the California Landscape Contractors Association to assist the Contractors State License Board.

Efraim Donitz, president of the CLCA, said the Professional Review Committees will provide qualified expertise to the CSLB during hearings on complaints filed against contractors by home owners.

"We feel it is our responsibility to provide the expert knowledge and experience necessary to arbitrate fairly a complaint by a home owner against a contractor," Donitz said. "We feel it is our responsibility to provide the expert knowledge and experience necessary to arbitrate fairly a complaint by a home owner against a contractor. If a complaint can be substantiated, the contractor should be penalized since he does not represent the industry well. Likewise, if the complaint is not sound, the contractor should be freed of any unnecessary financial burden or harm to his reputation."

NLA accepting entries for awards

The National Landscape Association is currently accepting entries for the National Residential Landscape Awards Program, now in its 14th year. All single family residential properties are eligible. Categories include active use areas, passive use areas, entrance areas (public areas) or the entire residential property. Any landscape professional may enter. The purpose of NLA's program is to recognize landscape professionals who create the design, and those professionals who are responsible for its execution and maintenance; both are awarded certificates when a project is chosen for national recognition. In addition, the property owner is sent a letter of commendation from the president of the NLA.

Entries will be judged on the basis of excellence, as well as practicality of design, selection of plants and materials, execution of the design and maintenance of the project. Scope of the project will be considered only in determining the category of entry.

Projects chosen for national recognition will be announced Feb. 6 at the NLA/GCA Landscape/Garden Center Management Clinic in Louisville, KY.

For an entry form, contact the National Landscape Association, 1250 I Street NW, Suite 500, Washington, D.C. There is a fee and other requirements to enter. Deadline for entries is Nov. 1, 1983.

1984 Galt House in Louisville

The 1984 National Landscape Association and Garden Centers of America Management Clinic will be Feb. 5-8 at Galt House, Louisville, KY. Interested persons should contact NLA at its new address.

NEWS *from page 10*

the firm's original name was based on the fact "that no other name describes our company as well -- it says who and where we are and what we are in business to do."

The company has also completed its corporate acquisition of the Northern California sod production interests of John Nunes, who will continue his relationship with the company as contract sod grower in Tehachapi, CA.

Pacific Sod's management team

Richard Rogers

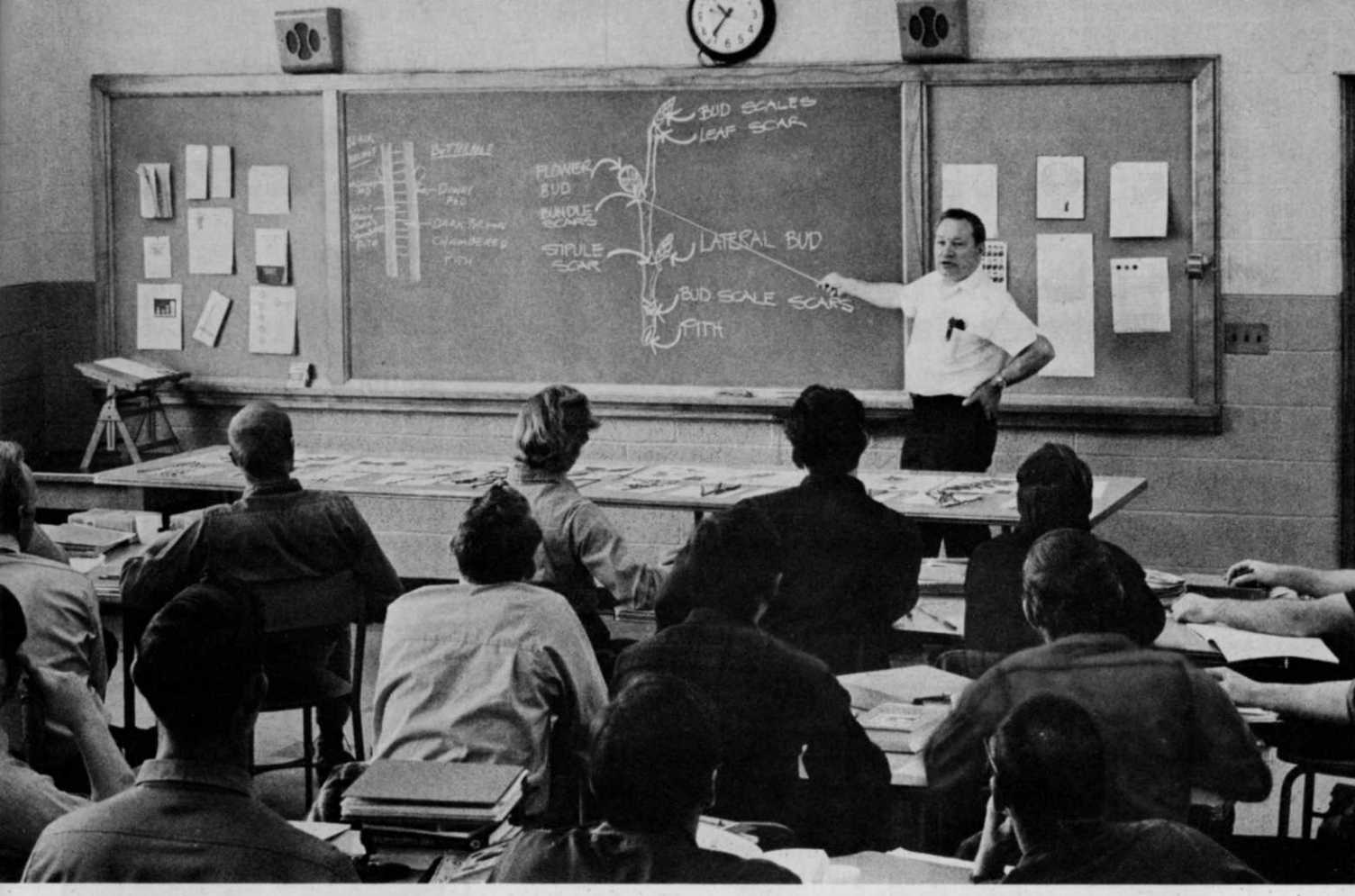
now consists of, in addition to Rogers, Bob Goodrich, senior vice president and general manager, Roger Ogilvie, senior vice president and chief financial officer, Jack Gribben, vice president in charge of advertising, Bill Tavener, vice president and general manager of wholesale sales, John Culbertson, vice president and marketing director and Ben Lucas, assistant vice president and general manager for northern California. Lucas and Tavener are located at the company's northern California base in Patterson, the others at Pacific Sod's corporate headquarters in Camarillo.

EVENTS

Bring your slides to Sports Turf Show

The Sports Turf Managers Association will co-sponsor its third educational conference with the National Institute on Park and Grounds Management Nov. 6-10 at the Hyatt Hotel in Birmingham, AL. Turf managers for the Cleveland, Green Bay, WI, and Milwaukee professional sports stadiums will discuss their management systems. Topics to be covered include getting wet fields in shape fast, new low maintenance turfgrasses and field renovation in the Mid-Atlantic states. "Bring your slides and pictures along to share as others can benefit from what you do,"

continued on page 16



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Circle No. 107 on Reader Inquiry Card

GOVERNMENT UPDATE

2,4-D May Be Bargaining Point in Pesticide Battle

The workhorse of selective weed control for years, 2,4-D, appears to be a bargaining point in the battle to defend pesticide use in urban areas.

Jerry Faulring, president of Hydro-Lawn in Gaithersburg, MD, and former president of the Professional Lawn Care Association of America(PLCAA), recently predicted 2,4-D could be outlawed at certain levels of government before the end of this year. Faulring based his opinion on a flurry of pesticide legislation at the state and local level during the past 18 months.

The PLCAA, the National Arborist Association, and the 2,4-D Coalition have formed a pro-pesticide coalition called the National Environmental Law Foundation. The group will counter moves by environmental organizations seeking new legislation to ban important chemical tools and require impractical prenotification of owners of property adjacent to sprayed areas. Faulring is on the board of the new coalition.

Faulring suggested in a recent article in Lawn Care Industry magazine 2,4-D use be eliminated if possible since further defense of the pesticide would be difficult considering current local legislation developing against the product. "We could probably muddle through this year and next without 2,4-D by passing the buck for less weed control onto the government, as we did when chlordane was suspended for turfgrass use," Faulring said. "If we find the solution first(to 2,4-D), we could use our self regulatory advantage as a promotional advantage."

Another possible sign 2,4-D's position has changed is the recent sale of many of Dow Chemical's 2,4-D trademarks to Vertac, a privately held, Memphis-based chemical manufacturer. Chemical Week, a McGraw-Hill publication, speculated the sale of the trademarks was a move by Dow toward products with patent protection. Monsanto and Du Pont have stopped producing 2,4-D leaving SDS Biotech, Vertac and Dow as the only manufacturers in the U.S.

Dow Chemical's business manager for domestic agricultural herbicides, A. Charles Fischer, said the company will not reduce its capacity to produce 2,4-D, but will not take the product all the way to distributors. Velsicol and other chemical companies have chosen to sell some technical herbicides to reformulators rather than market to distributors. Therefore, Dow's move could be simply part of a trend of marketing to reformulators rather than to the distributor.

The point is 2,4-D is being used by environmentalists against urban pesticide applicators and Faulring believes the industry can relieve this political pressure by developing an alternative to 2,4-D before legislation requires it.

Some progress has been made in finding an alternative to 2,4-D in agriculture but that has not been true so far in the turf industry. Faulring stresses that 2,4-D is a vital component of turf herbicides and is not an evil toxin as the public has been led to believe. Yet, as agriculture has done, it is wise for the turf industry to also seek substitutes for 2,4-D in case politics win over the facts.

NEWS *from page 14*

said Mike Schiller of STMA. For more information, contact Executive Secretary Erik Madisen, Jr. at (414) 733-2301.

EQUIPMENT

New Toro brands on National Tour

Toro's "Greatest Show on Turf" tour will visit 40 cities this fall to showcase the Minnesota manufacturer's new products, including the Hydraulic 5-unit Reelmaster 350-D, 5-and 7-blade Reelmaster Gang Mowers and the 36- and 52-inch Walk Behind Mowers.

"The Road Show allows us to show

customers our products in action, but more importantly it gives our customers a chance to meet with their peers and and us to discuss their turf care needs," said Dennis Brown, marketing programs manager. The tour, which began in August, is expected to end in December.

LANDSCAPE

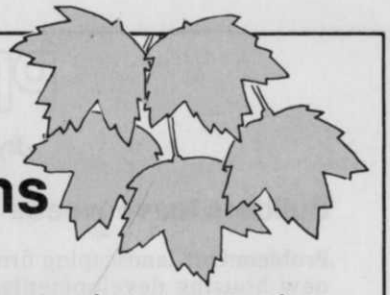
Ohio Short Courses begin in December

The 1983-84 series of the Landscape Design Short Courses for Residential Properties, sponsored by the Cooperative Extension Service of the Ohio State University, will begin Dec. 12. The series of five, three-day programs will continue until Aug. 1, 1984.

Course offerings are as follows: Course I - Landscape Design, Dec. 12-14; Course II - Advanced Landscape Design, Jan. 11-13; Course III - Design Detailing. Prerequisite is Course II; Course IV - Landscape Drawing Rendering, March 21-23; Course V - Planting Design, Prerequisite is Course II, Aug 1-3.

All courses are $95. For registration information, contact Fred K. Buscher, Area Extension Center, OARDC, Wooster, OH 44691, (216) 263-3831.

By Douglas Chapman, horticulturist, Dow Gardens, Midland, Michigan



When leaves fall, work remains

NOVEMBER JOB FOCUS

1. **Deciduous Tree and Shrub Planting**
2. **Mulching and Winter Protection**
3. **Fall Turf Fertilization**
4. **Dormant Lawn Seeding**

November's maintenance log includes projects that assure next year's landscape. The tasks that highlight November are deciduous tree and shrub planting, mulching and winter protection, fall turf fertilization, and dormant lawn seeding.

Moving deciduous plants

After deciduous trees and shrubs have lost their leaves, one can easily transplant them with a high degree of success. The plant's size should really dictate whether to transplant balled and burlapped or bare root. Considering a commerical landscape, most trees and shrubs should be transplanted B and B. Why? Although the plants are dormant, there are still needs for water and a full knowledge that winter conditions are a severe stress on trees and shrubs. When transplanting B and B, not only is the chance of frost heaving reduced, but also the root system is kept moist and, therefore, ready to initiate growth in the spring. After heavily watering the new transplant, one should also mulch heavily. This heavy mulch over the root system helps reduce the effects of winter; reduces water loss and modifies temperature extremes.

Winter protection

Generally, winter protection is designed to reduce or modify the harsh conditions of winter. For evergreens that means shading from winter sun and/or wind, thereby, reducing sun scald or transpiration damage, e.g. southwest injury. This windbreak, or shading, can be nothing more than snow fencing, burlap, or, after Christmas, used Christmas trees -- anything that will slow down the wind and, thereby, reduce transpiration loss to the foliage. One must remember, the root system is still frozen. Further, those bright, clear sunny days of winter can often result in sun scald and/or frost cracking. Therefore, shading protection against these is extremely important.

Mulch is the landscape's blanket or insulation. It reduces temperature fluctuation and, therefore, holds the soil frozen later in the spring while reducing temperature fluctuation during winter, thus fewer "false starts" during early spring. Further, it keeps the plants from being heaved out of the soil. The mulch to be applied can be compost, straw, wood chips, or any organic matter that modifies climatic extremes. Further, it is better to use something that can be left on the beds or worked in, becoming part of the soil- organic matter. This practice modifies winter temperatures, conserves moisture and helps reduce weed competition.

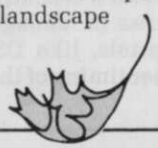
Late fall feeding

Late fall turf fertilization in the northeast is becoming a more current practice. This practice gives one the opportunity to apply fertilizer during a slower maintenance period rather than the busy spring. Further, it places the fertilizer in a position to be utilized early in the spring. Results at Ohio and Michigan State universities have shown that on heavy soils, fall fertilizer can be extremely effective while encouraging early spring green-up. When considering a sandy or well-drained soil, early spring fertilization, after the frost is out of the soil but before growth starts, is still best. One should be alerted that late fall fertilizer should be applied to the soil before it freezes. If here is frost in the soil, the fertilizer will simply leach away and not be effective but when applied prior to the soil freezing, the fertilizer will literally freeze in the root zone and be ready for spring.

Dormant seeding

Dormant lawn seeding can be an effective way of having a quality lawn for early spring. The lawn is prepared in the standard method — rototill the soil, work in the fertilizer, but not seeded in the fall until after dormancy has set in usually Nov. 1 to 15. Further, the newly seeded areas should be mulched to reduce chance of erosion and/or desiccation of seed. The advantages of dormancy-seeding include early spring germination of seed and, therefore, establishment of lawn — even earlier than one could seed during the spring months. Further, the grass becomes established before the weeds start. It spreads the installation of that lawn into a period of the year when horticultural tasks are less demanding.

November's landscape log should include preparation for the next growing season. This preparation is highlighted by deciduous tree and shrub transplanting, winter protection, fall fertilization and dormant lawn seeding. November becomes an important landscape maintenance month. One can dictate the quality of next season's landscape at a period when the press of current landscape maintenance is reduced.



WT&T PROBLEM SOLVERS

By Balakrishna Rao, Ph.D., and Thomas P. Mog, Ph.D

Builders leave weeds

Problem: Our landscaping firm establishes lawns in new housing developments. Often, the builders leave the property in the back undisturbed about 20 to 25 feet from the house foundations. In these areas we find lots of annual and perennial weeds. Even though we follow standard lawn establishment procedures, we still find a lot of perennial, grassy weeds later. The clients think the weeds are in our seed mix. Can we use Roundup or fumigation to kill the weeds prior to establishment?(Ohio)

Solution: Perennial grassy weeds in lawns present serious turf quality problems. Prior to tilling, grading and seed bed preparation, the first step in soil preparation should be to control persistent weeds. This requires use of nonselective herbicides or soil fumigation.

Use of nonselective herbicides such as amitrole, dalapon, or glyphosate should make the existing vegetation easier to manage. However, these chemicals will not have any effect on viable seeds in the soil which may cause problems later. In your situation, soil fumigation is preferred so that all the viable weed seeds in the seed bed are killed.

Application of herbicides or fumigants will add to your job cost. You should explain the weed situation to your customer and tell them how weed control now will save them time and money later.

If the customer selects fumigation, you have two choices, methyl bromide or metham (Vapam). Only certified pesticide applicators can apply methyl bromide, a gas.

Topdressing selection

Problem: Every year we have used either Dacthal or Betasan in the spring for preemergent control of crabgrass in lawns. Still we get a number of calls from clients in the summer about crabgrass problems. What are we doing wrong? We are thinking of using post-emergent materials like DSMA or MSMA. (North Carolina)

Solution: The best approach to crabgrass management in established turf areas is the use of preemergent herbicides like the ones you mention. If you are getting too many calls about crabgrass in the summer, it is important to make an on-site evaluation of the problem to understand why crabgrass is present in the specific areas.

Several factors could contribute to the crabgrass problem. Preemergents herbicides provide a thin chemical barrier which is toxic to germinating crabgrass seddlings. Variable results will occur when this barrier is disturbed by raking, traffic, insect activity, heat, and/or photodegradation of the active ingredient. Check your application timing and consider a second application at half rate.

Success in managing crabgrass with post-emergent materials, like DSMA or MSMA, dependss upon proper timing of the application. For best results, the mateiral should be applied to juvenile seedlings(two-leaf stage). Depedning on the number of seeds carried over from the previous year, the best you can expect is only 60 to 65 percent control.

Quite often the problem is recognized only when the crabgrass is mature. Variable results have been observed when DSMA or MSMA were applied to mature stands.

Crabgrass after spraying

Problem: Please give some of the benefits of topdressing and the things we should consider when selecting topdressing materials.(Pennsylvania)

Solution: Topdressing is being used widely in the management of quality, golf course putting greens. If properly managed, there are several benefits of topdressing, including thatch control, leveling and smoothing of the soil surface, improvement of soil properties, and winter turf protection.

The topdressing mix should be compatible with the existing soil for the best results. For example, the addition of sand on turf growing on silt loam soil may cause layering and problems in water movement and retention. These will lead to restricted root development.

Since all sands are not the same, as far as water movement and retention, it is important to use only sand which will allow percolation of 4 to 10 inches of water per hour. The United States Golf Association recommends sand sizes from 1.0 to 0.1 mm for topdressing.

Peats also show different properties. If feasible, use excellent, laboratory-tested, commercial mixtures. If you are making your own mixtures, have the sands, peats, and soil tested by a recognized laboratory for percolation rates. **WTT**

Balakrishna Rao is plant pathologist and Thomas Mog is pest management specialist for Davey Tree Expert Co., Kent, OH.

Questions should be mailed to Problem Solver, Weeds Trees & Turf, 7500 Old Oak Boulevard, Cleveland, Ohio 44130. Please allow 2-3 months for an answer to appear in the magazine.

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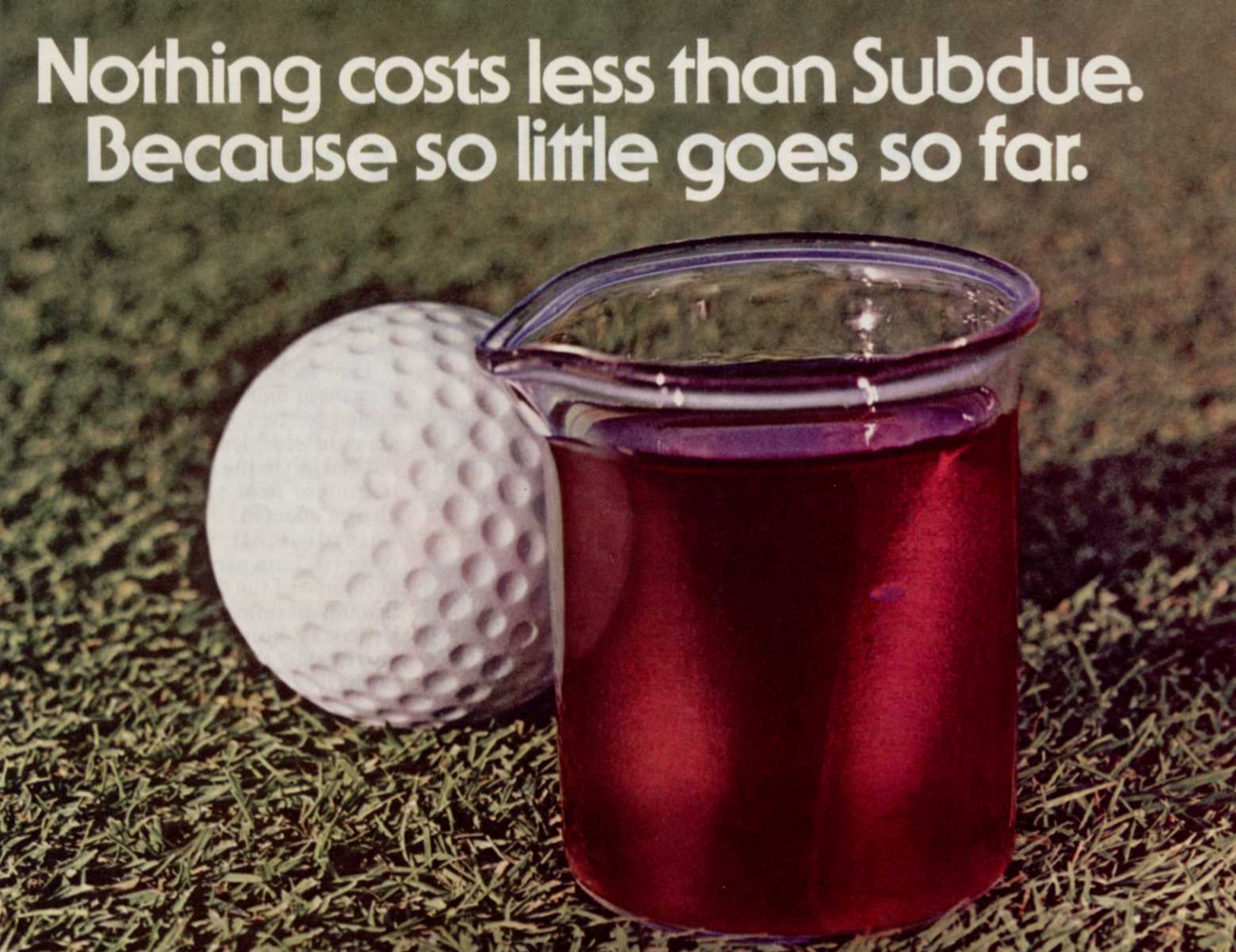

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Circle No. 219 on Reader Inquiry Card

Rain Dampens Seed Harvest:

Yields Are Off One Third

A strange weather pattern called El Nino hampers drying and harvesting of seed in the field. Growers ask for disaster assistance.

By Bruce Shank, executive editor

Imagine you just finished mowing an overgrown lawn when it starts pouring. It rains for two solid weeks. But, you still have to pick up the clippings.

Now you know how the growers of turf seed in Oregon, Washington, and Idaho feel this year.

They face crop reductions of 30 percent or more in 1983 because it rained for two weeks after many acres of seed-ladden grass were cut and left in the field to dry. Furthermore, next year's crop will also be affected.

Hardest hit were annual ryegrass, Linn perennial ryegrass, and some of the fine fescues. Tall fescue, perennial ryegrass and Kentucky bluegrass crops were also hurt by the wet weather during harvest. Bentgrasses were not hurt since they are later maturing grasses which had not yet been cut when the rain started falling.

All indications before the rain were that 1983 would be a bumper year. Some growers expected yields of 30-40 percent over 1982. Instead, they weighed their loads after combining to find 600 to 800 lbs. of seed per acre rather than 1,200 lbs. Much of the seed is darker in color from lying in the wet fields. Germination rates are down below 80 percent for some lots of annual ryegrass.

Field burning *has been complicated by regrowth and matted straw in the fields after harvest.*

Linn County Extension Agent *Hugh Hickerson shows magazine staff shattered and germinated seed beneath the windrows.*

Combines are jammed *by windrows which are entwined with green regrowth.*

Compact enough for tight spaces. Strong enough to go the distance.

When you buy a new John Deere 318 or 420 Lawn and Garden Tractor, you get maneuverability in a strong package that stands up to the daily abuse of big mowing jobs.

Strength begins with a beefy drive-train that delivers smooth, dependable power. Heavy-duty gasoline engines develop 18 and 20 hp in the 318 and 420, respectively. These reliable twin-cylinder engines feature an aluminum block with cast-iron cylinder liners plus full-pressure lubrication to keep them running cooler for longer life.

Hydrostatic drive makes it easy to match travel speed to the job. You control speed and direction with one lever; there's no clutching or gearshifting to slow you down.

Power steering permits even easier handling. It's standard on both tractors to speed mowing in cramped areas. And the 318 and 420 have a 26-inch turning radius. Individual rear-wheel brakes give you quick stops and let you make tight turns.

There's a full line of mowers: a 46-inch center-mounted mower for the 318, a 60-inch center-mounted mower for the 420, and a 60-inch rear-mounted grooming mower for both. There are also more than 50 attachments available for jobs from snow removal to tillage.

Easy servicing increases productivity. So does the human-engineered operator's platform. It features an adjustable high-back cushioned seat and conveniently located color-coded controls.

Visit your John Deere dealer to take a closer look at these maneuverable tractors. Their strength will really show up. So will the dealer's expertise.

For the name of the nearest dealer, or free folder on the 318 and 420 Lawn and Garden Tractors, call 800-447-9126 toll free (Illinois, call 800-322-6796). Or write John Deere, Dept. 50, Moline, Illinois 61265.

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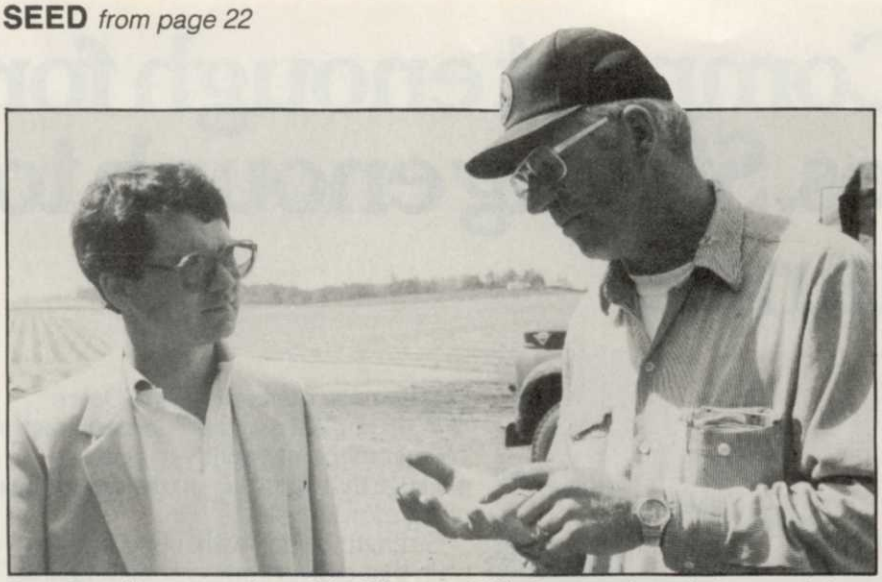
SEED *from page 22*



Dave Doerfler, *a member of the Silverton Hills Growers Association, explains the effects of the rain on his acreage and seed cleaning operation to Shank.*

"This has been the wettest July on record," said Dave Nelson, executive director of the Oregon Seed Council. "Some growers in the Willamette Valley and the Silverton Hills lost entire fields because of the rain. Bad burns are common which will affect next year's production."

"Some seed growers will go under this year," states Hugh Hickerson, Linn County extension agent. "Many of the younger farmers are heavily mortgaged to buy land and get started. One bad year can wipe them out."

Seed growers in Oregon are asking for disaster assistance since

Seed Supply Report

Listings are by cultivar name, company, and supply condition.
A represents supplies to be near surplus, B adequate, and C possible shortage.

Kentucky Bluegrass
Adelphi, Adikes, A
Admiral, International Seed, B
America, Pickseed, C
Aquila, Northrup King, C
Banff, Pickseed, C
Baron, Lofts, C
Bensun, Warrens, A
Birka, Burlingham, C
Columbia, Turf Seed, B
Eclipse, Garfield Williamson, B
Enmundi, International Seed, B
Enoble, International Seed, B
Fylking, Jacklin, B
Georgetown, Lofts, C
Haga, Burlingham, B
Merit, Full Circle, A/B
Midnight, Turf Seed, C
Mystic, Lofts, C
Nassau, Lofts, B/C
Nugget, Northup King, C
Parade, Northrup King, C
Park, Northrup King, B
Ram I, Lofts, C
Rugby, Northrup King, B
Scenic, International Seed, B
Shasta, Turf Seed, C
Sydsport, Burlingham, B
Touchdown, Pickseed, C
Vantage, International Seed, B

Perennial Ryegrass
Agree, Lofts, C
Allstar, Adikes, C
Barry, Lofts, B
Birdie, Turf Seed, C
Birdie II, Turf Seed, C
Blazer, Pickseed, B
Citation, Turf Seed, B
Cowboy, Lofts, C
Dasher, Pickseed, B
Delray, Northrup King, B
Derby, International Seed, B
Elka, International Seed, C
Eton, Northrup King, C
Fiesta, Pickseed, B
Gator, International Seed, B
Goalie, Northrup King, C
Manhattan, Turf Seed, C
Manhattan II, Turf Seed, B
NK 200, Northrup King, C
Omega, Turf Seed, B
Palmer, Lofts, B
Pennant, Burlingham, B
Pennfine, Northrup King, B
Prelude, Lofts, B
Repell, Lofts, C
Yorktown II, Lofts, B

Tall Fescue, Turf Type
Adventure, Warrens, C
Brookston, International Seed, B
Clemfine , Lofts, C
Falcon, Burlingham, C
Galway, Northrup King, C
Houndog, International Seed, B
Jaguar, Garfield Williamson, C
Mustang, Pickseed, C
Olympic, Turf Seed, C
Rebel, Lofts, C

Chewings Fescue
Adonis, International Seed, B
Agram, Pickseed, B
Atlanta, Northrup King, B
Checker, International Seed, B
Highlight, International Seed, B
Jamestown, Lofts, B
Shadow, Turf Seed, B
Wintergreen, Northrup King, A

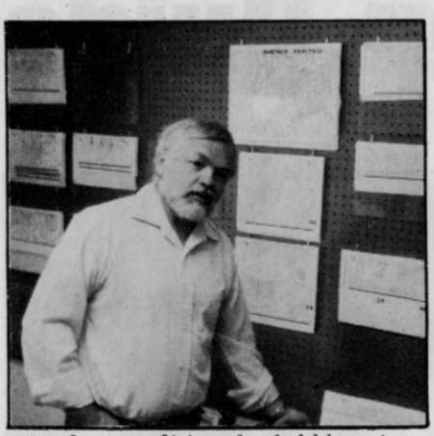
Creeping Red Fescue
Dawson, Northrup King, B
Ensylva, International Seed, B
Fortress, Turf Seed, C
Ruby, Northrup King, B

Hard Fescue
Aurora, Turf Seed, C
Reliant, Lofts, B
Scaldis, Northrup King, B
Spartan, Pickseed, C
Tournament, Pickseed, B
Waldina, Turf Seed, B

Bentgrass
Astoria, Northrup King, C
Bardot, Lofts, C
Emerald, International Seed, B
Highland Colonial, Northrup King, B
Penncross, Tee-2-Green, B
Penneagle, Tee-2-Green, B
Seaside, Northrup King, B

Other
Fults, Puccinellia distans, Northrup King, B
Sabre, Poa trivialis, International Seed, C

Overseeding Blends, Mixtures
CBS, Turf Seed, B
Dixie Green, International Seed, B
Futura Plus, Pickseed, B
Marvelgreen, Lofts, B
Medalist, Northrup King, B
Oregreen, Turf Seed, B
Ph.D., International Seed, B
Showboat, International Seed, B



Weather conditions*for field burning are provided twice a day by Oregon Seed Council Meteorologist "Irv" Tillung.*

losses are estimated above 30 percent, the requirement set by the government to qualify for low interest loans.

More than 300,000 acres in Oregon are used for production of turf seed, primarily ryegrasses and fescues.

Carryovers from last year of Kentucky bluegrass and perennial ryegrass may help growers meet demand this year, but turf type tall fescues and some fine fescues will be in short supply.

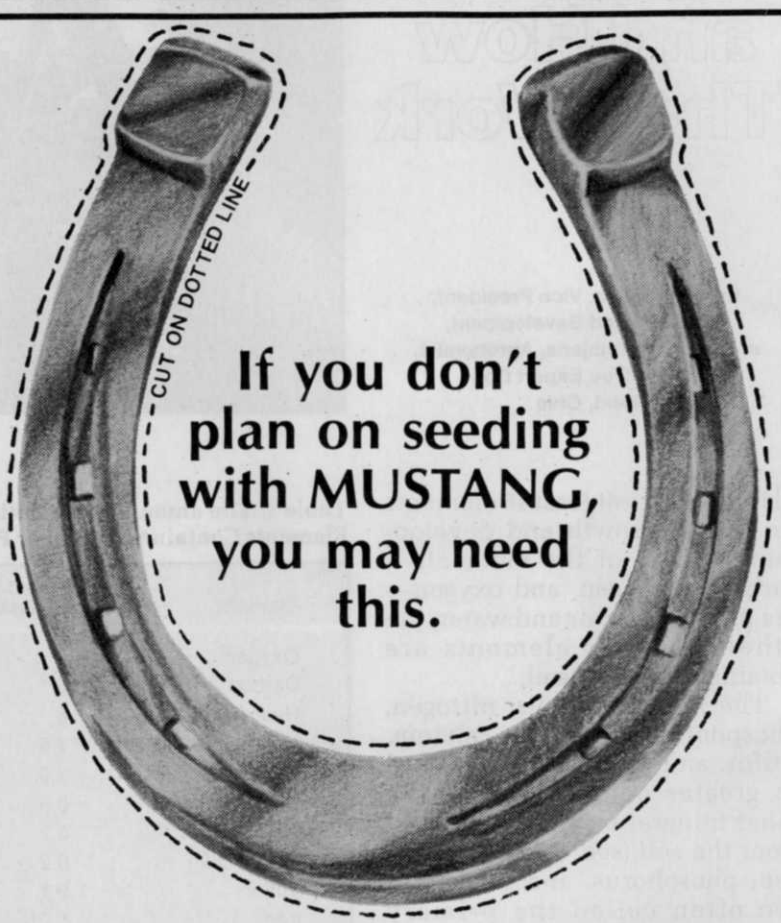
The rain causes a series of production problems. Once the seed crop is cut and placed in windrows to dry, the moisture content of the seed is too high to process. The grower has to wait for the moisture content to drop to 12 percent before combining to pick up the seed. Rain slows the drying of the seed in the field, causes combines to jam when the seed is finally harvested, and encourages seed which has shattered and fallen to the ground to germinate. The regrowth makes the windrows difficult for the combines to pick up.The newly germinated grass is undesirable since only the parent grass produces the right genetic combination.

After the fields are combined, they are burned to destroy unwanted straw, harmful fungi, second generation seed, and to encourage branching of the parent grass during regrowth. The additional branches help produce more seed the following year.

If the farmers don't get a satisfactory burn they can try to burn the fields a second or third time using propane torches at considerable expense. It appears likely that yields for next year will be down because of bad burns.

Doyle Jacklin of Jacklin Seed Co. in Post Falls, Idaho, estimates rain in his area has reduced Kentucky bluegrass yields by ten percent. He blames winter rains for causing fertility problems and another 20 percent loss in yields.

All seed companies report increasing demand for seed brought about by renewed construction and dramatically improved sales to sod growers. "Sod growers in many sections of the country sold out this spring and needed to replant quickly," said Jacklin. "Severe heat in the Midwest this summer should improve renovation business this fall." **WTT**



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Fertilizer Guide

Part I:

Fertilizers and How They Work

By Roger Funk, Vice President, Research and Development, and Richard Rathjens, Agronomist, Davey Tree Expert Co., Kent, Ohio

Plants require at least 16 elements for proper growth and development. Three of the elements—carbon, hydrogen, and oxygen—are provided by air and water; the other essential elements are obtained from the soil.

The macronutrients; nitrogen, phosphorus, potassium, calcium, sulfur, and magnesium; are used in greater quantities than the other mineral elements absorbed from the soil.(see Table 1) Nitrogen, phosphorus, and potassium are often called the primary nutrients because of the amount used by the plants and their importance in supplemental fertilizers.

The micronutrients; iron, manganese, copper, zinc, boron, molybdenum and chlorine; are required in smaller quantities but are no less important. The so-called "acid-loving" plants have a relatively high requirement for certain micronutrients, and chlorosis caused by an iron deficiency is a common ailment when these plants are grown in alkaline soils (over pH 7.0). Because of reserves normally found in the soil, the addition of supplemental micronutrients is not often necessary unless the soil is excessively alkaline or sandy.

Table 1. The amount of Essential Elements Contained in Higher Plants*

Element	Percent of Plant Tissue**
Oxygen	45
Carbon	45
Hydrogen	6
Nitrogen	1.5
Potassium	1.0
Calcium	0.5
Phosphorus	0.2
Magnesium	0.2
Sulfur	0.1
Iron	0.01
Chlorine	0.01
Manganese	0.005
Zinc	0.002
Boron	0.002
Copper	0.0006
Molybdenum	0.00001

* Adapted from: B. R. Stout, 1961. Proceedings of 9th Annual California Fertilizer Conference, pp 21-23.

** These percentages vary from different species and for the same species grown under different conditions.

Fertilizers

Fertilizer is any material that supplements the soil's supply of elements required for plant growth and development. Fertilizers may be categorized as natural organic, synthetic organic, or inorganic based on their source and chemical structure.

Organic fertilizer consists of nutrient elements derived from compounds with a carbon structure. The term organic when applied to fertilizer should include only organic materials that are insoluble in water.

All living matter—plant or animal—is composed of compounds with a carbon structure. Proteins, fats, carbohydrates and other compounds synthesized by an organism have one common factor—a carbon structure. Any of these materials could be considered as organic fertilizers when placed in the soil. Common examples of **natural organic** fertilizers are animal manure, bonemeal, sewage sludge and plant refuse.

Scientists have synthesized compounds with a carbon structure which are also organic. Examples of **synthetic organic** fertilizers are ureaformaldehyde and isobutylidene diurea.

Inorganic fertilizers are nutrient elements derived from

sources which are not organic, those which have neither a carbon structure nor which have been derived from living matter. Examples of inorganic fertilizers are ammonium nitrate, ammonium phosphate, potassium nitrate and potassium chloride.

A complete fertilizer contains sources of nitrogen, phosphorus, and potassium. An incomplete fertilizer contains one or two of these elements in any combination, but never all three. Other fertilizer nutrients such as iron or magnesium may be present but are not considered in the definition of "complete" and "incomplete" fertilizers.

Analysis and Ratio

Fertilizer analysis or grade is the minimum guaranteed percentage by weight of nitrogen(N), phosphorus (expressed as P_2O_5 equivalent), and potassium (expressed as K_2O equivalent), and is printed on the container in that order.

For example, a 100 lbs. bag of 20-10-5 fertilizer is formulated from a nitrogen source(s) that contains 20 lbs. of elemental nitrogen, a phosphorus source(s) that contains the equivalent of 10 lbs. of P_2O_5, and a potassium source(s) that contains the equivalent of 5 lbs. of K_2O. Any of these elements missing from the formulation would be represented by a zero in the analysis. Ammonium nitrate, for example, which does not contain phosphorus or potassium, has an analysis of 33-0-0.

In addition to the total nitrogen, water insoluble nitrogen(WIN), if present, is also printed on the label as a percent of the total weight. For example, if half of the nitrogen of a 20-10-5 fertilizer is in a water insoluble form, the WIN content is 10%. Although WIN indicates the portion of nitrogen in a controlled-release fertilizer that is slowly soluble, it is not appropriate for coated fertilizers that encapsulate soluble nitrogen. In this case, the controlled-release nitrogen may be expressed in terms of dissolution rate. See Slow-Release Nitrogen for a more detailed description.

Fertilizer ratio is the relative amounts of nitrogen, phosphorus and potassium. A fertilizer with an analysis of 20-10-5 would contain four times as much nitrogen as potassium and twice as much phosphorus as potassium.The ratio then would be 4:2:1.

Table 2. The essential elements and the forms available to green plants.

Elements		Available forms
1. Macronutrients		
Nitrogen	(N)	NO_3-, NH_4+, Urea (some)
Phosphorus	(P)	HPO_4--, H_2PO_4-
Potassium	(K)	$K+$
Calcium	(Ca)	$Ca++$
Magnesium	(Mg)	$Mg++$
Sulfur	(S)	SO_4--, SO_3-
2. Micronutrients		
Iron	(Fe)	$Fe++$, $Fe+++$
Manganese	(Mn)	$Mn++$, $Mn+++$
Copper	(Cu)	$Cu+$, $Cu++$
Zinc	(Zn)	$Zn++$
Boron	(B)	BO_3---
Molybdenum	(Mo)	MoO_4--
Chlorine	(Cl)	$Cl-$

Absorption

All fertilizer nutrients, regardless of the source, are absorbed by plant roots as charged atoms or groups of atoms called ions—nutrient salts (see Table 2). These ions exhibit either a positive or a negative charge which is essential for root absorption by electrical attraction.

Inorganic fertilizers form ions readily when dissolved in water and therefore are quickly available for root absorption. Organic fertilizers—both natural and synthetic—must be hydrolyzed(decomposed) by soil microorganisms from complex compounds to the same nutrient salts provided by inorganic fertilizers. The rate of decomposition is dependent upon soil factors such as temperature, moisture and pH.

Burn

Fertilizer burn is the visible symptom of insufficient water in a plant associated with an overapplication of fertilizer salts.

The movement of water across the root cell membrane is regulated by the concentration of dissolved fertilizer salts in soil solution relative to the dissolved salts within the cell. As fertilizer salts dissolve in water, they raise the osmotic pressure of the solution. Water always moves from the side of the membrane with the low osmotic pressure to the side with higher osmotic pressure. Root cells actively absorb fertilizer salts from soil solution, and under normal conditions, maintain a higher osmotic pressure.

If excess fertilizer salts are applied and raise the osmotic pressure of soil solution, water cannot enter the cell and may actively move out of it. The resulting injury is known as fertilizer burn or physiological drought.

Salt index values are a measure of a fertilizer's relative tendency to increase the osmotic pressure of the soil solution. Sodium nitrate has been given a salt index value of 100 and the value for all other fertilizers is relative to an equal weight of sodium nitrate. The higher the salt index, the greater the potential for a fertilizer to raise the osmotic pressure of soil solution and, thus, cause burn. See Table 3 for salt indexes.

Because some nutrient sources are more concentrated than others(have higher percentages of N,P,or K) the actual increase in burn potential is affected by the application rate as well as the salt index. The partial salt index is calculated per unit of each nutrient and compares the rela-

Fertilizer

Table 3. Salt indexes of common fertilizer sources*

Fertilizer	Formula	% N	% P_2O_5	% K_2O	Salt Index	Partial** Salt Index
Nitrogen sources						
Ammonium nitrate	NH_4NO_3	35.0	—	—	104.7	2.99
Ammonium sulfate	$(NH_4)_2SO_4$	21.2	—	—	69.0	3.25
Sodium nitrate	$NaNO_3$	16.5	—	—	100.0	6.06
Potassium nitrate	KNO_3	13.8	—	—	73.6	5.34
Urea	H_2NCONH_2	46.6	—	—	75.4	1.62
Natural organic		5.0	—	—	3.5	0.70
Monoammonium phosphate	$NH_4H_2PO_4$	12.2	—	—	29.9	2.45
Diammonium phosphate	$(NH_4)_2HPO_4$	21.2	—	—	34.2	1.61
Phosphorus Sources						
Superphosphate	$Ca(H_2PO)_2+CaSO_4$	—	20.0	—	7.8	0.39
Triple superphosphate	$Ca(H_2PO_4)_2$	—	48.0	—	10.0	0.21
Monoammonium phosphate	$NH_4H_2PO_4$	—	61.7	—	29.9	0.49
Diammonium phosphate	$(NH_4)_2HOP_4$	—	53.8	—	34.2	0.64
Monopotassium phosphate	KH_2PO_4	—	52.2	—	8.4	0.16
Potassium Sources						
Potassium chloride	KC1	—	—	60.0	116.3	1.94
Potassium nitrate	KNO_3	—	—	46.6	73.6	1.58
Potassium sulfate	K_2SO_4	—	—	54.0	46.1	0.85
Monopotassium phosphate	KH_2PO_4	—	—	34.6	8.4	0.24

* Adapted from: Rader, Jr., L.F., L.M. White and C.W. Whittaker. 1943. The Salt Index—A Measure of the Effect of Fertilizers on the Concentration of the Soil Solution. Soil Science Volume 55, pp 201-218.
** Calculated per unit of N, P_2O_5, or K_2O.

tive burn potential of fertilizers based on equal amounts of nitrogen or equivalents of P_2O_5 or K_2O.

Effects of Soil pH

The term pH expresses the relative concentration of hydrogen(H+) and hydroxyl (OH-) ions in solution. A pH of 7.0 means the hydrogen and hydroxyl ions are equal and the solution is said to be neutral. A pH below 7.0 means the solution contains more hydrogen ions than hydroxyl ions and is said to be acid. Similarly, a pH above 7.0 means the solution contains more hydroxyl ions than hydrogen and is alkaline.

Soil pH may influence nutrient absorption and plant growth through the effect of hydrogen ions and their indirect influence on nutrient availability. In most soils the latter effect is the most significant.

The presence of an element in the soil is no guarantee that it is in a soluble form available for absorption. The concentration of hydrogen and associated ions affects soil reaction and the formation of soluble and insoluble compounds. All nutrients must be

> The presence of an element is no guarantee it is available to plants.

soluble to be available for root absorption.

Each nutrient has a pH where it is most available because it forms a large proportion of soluble compounds at that particular pH range. See Figure 2 for pH ranges and availability of nutrients.

Plant species differ in their response to the soil acidity

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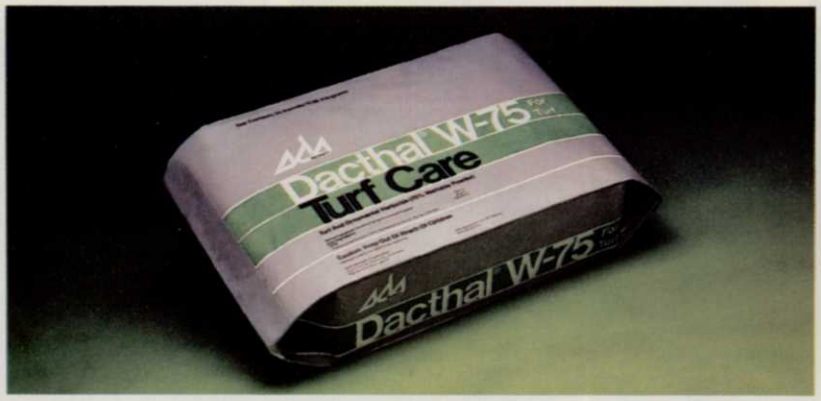

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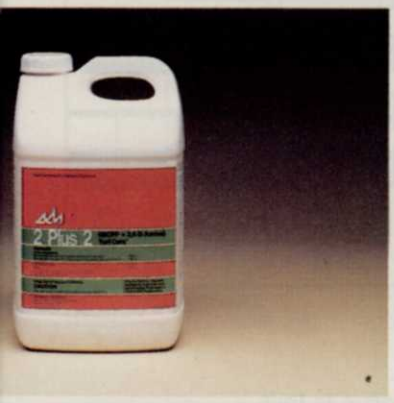
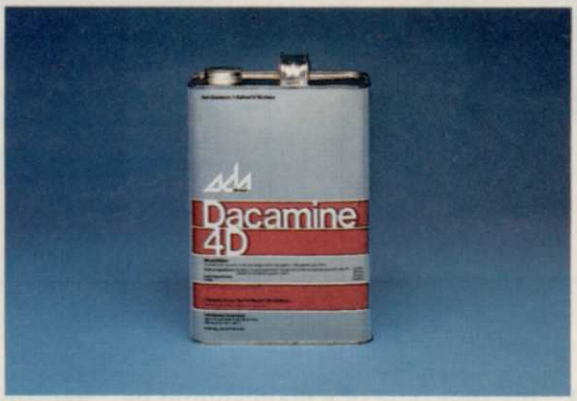

2 Plus 2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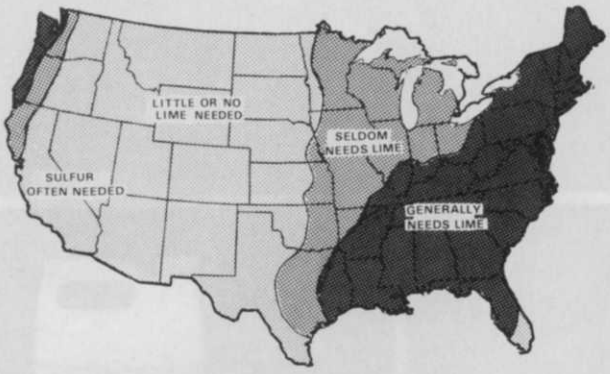
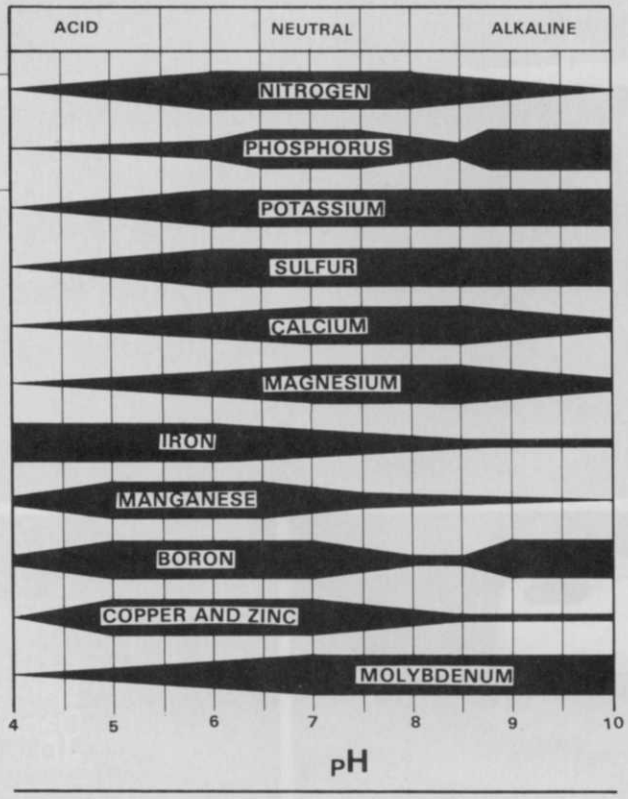


Geographic trends *in soil pH amendment.*



because of differences in nutrient requirements. For most plants, a pH of 6.5 fits the availability of most nutrients, without toxic amounts of any nutrient.

However, certain plants—such as rhododendrons, azaleas, pines and camellias—require comparatively large amounts of nutrients that are soluble in acid solution. They are "acid-loving" plants and grow best in soils of pH 5.5.

Soil acidity, as such, is seldom toxic to plants, but below pH 5.5 certain elements such as aluminum and manganese may become soluble to levels toxic to plant growth.

It has also been shown that pH levels affect the rate of of thatch decomposition, since they influence the organisms which break down thatch.

In some cases, nutrient availability can be improved by correction of the soil pH as well as by supplemental fertilization. Sulfur and agricultural lime are the materials used most frequently to alter the soil reaction or pH.

Lime increases the pH (decreases acidity); sulfur lowers the pH (increases acidity).

Ideally, the pH of soil within the root zone of a plant should be measured every three to five years and, if necessary, adjusted to the most favorable range for that particular species. Unfortunately, lowering the pH of an alkaline soil is not always succesful, particularly if the soil is inherently calcareous with significant calcium reserves.

Leaching

Leaching is the removal of materials in solution from the root zone. Leaching is caused by percolation, the lateral and downward movement of water through soil. Loss of nutrients due to leaching is proportional to the amount of water percolated through the soil. Water dissolves minute quantities of mineral and organic matter. Soil and weather conditions affect leaching.

All nutrients are subject to leaching, but not to the same degree. Calcium losses are the greatest of any nutrient known. Nitrate salt—the form of nitrogen primarily absorbed by plant roots—moves with ground water and rapidly leaches from the root zone. Magnesium, sulfur and potassium are moderately leached, whereas only a trace of phosphorus is lost.

Primary Fertilizer Elements

Nitrogen, phosphorus and potassium are the three nutrients required in the greatest quantity from the soil. In addition to these, iron is most likely to be found deficient in soils. Soil and tissue analysis can be used to determine the deficiency of any nutrient.

Nitrogen

Nitrogen is required in larger amounts than other elements supplied by the soil. Compounds formed by the plant from nitrogen comprise up to 50 percent of the dry weight of the plant. Nitrogen is a component of proteins, chlorophyll, amino acids and enzymes.

Nitrogen is more often deficient in soils than any of the other essential nutrients.

Plants can absorb nitrogen as either the ammonium (NH_4^+) or nitrate (NO_3^-). Urea or inorganic forms of nitrogen are converted to ammonium which is subject to volatilization when surface applied. More than 25 percent can be lost to volatilization under certain conditions.The ammonium form of nitrogen may be taken up

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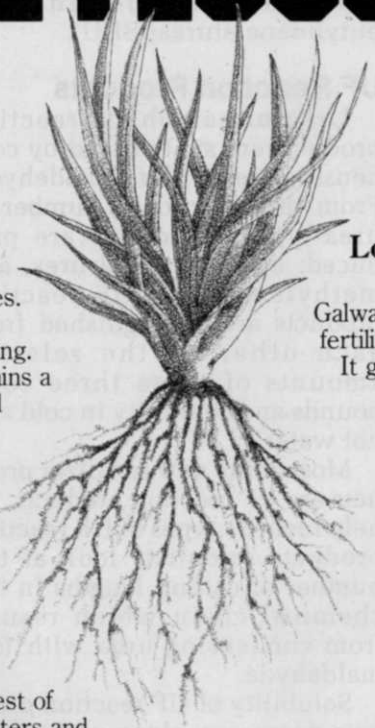

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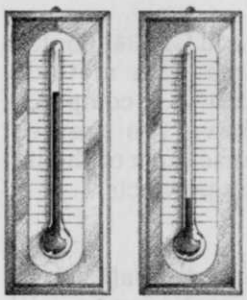

Improved performance against disease and extreme temperature.

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Galway requires only limited amounts of water and fertilizer to produce an attractive, dark green turf. It grows slower, which means less mowing. And its improved fine-leafed texture improves density and uniformity.

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MEDALIST TURF PRODUCTS

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by plant roots or transformed to nitrate which is the form most nitrogen is absorbed by plants.

Since nitrate ions are negatively charged, they are not absorbed by soil colloids (negatively charged) and readily move with soil water. Thus, heavy rainfall or irrigation may move nitrate below the root zone.

Because of the transitory nature of nitrogen in mineral soils, soil analysis is not as useful in determining deficiencies as an observation of symptoms. Nitrogen deficiencies are observed as uniformly yellowish-green leaves or needles which are more pronounced in older tissue. Leaves are small, thin and may start dying at the tips. The growth rate is reduced.

Nitrogen sources used for horticultural fertilization are often categorized as quick-release or controlled-release, based upon the rate nitrogen becomes available to the plant.

Controlled-Release

Controlled-release nitrogen sources include both slowly soluble nitrogen, which is an inherent characteristic of the fertilizer, and slow-release nitrogen which is imparted to a soluble fertilizer by an artificial coating.

In general, both types cost more per unit of nitrogen than quick-release sources and provide the following advantages: gradual supply of nitrogen which reduces the number of necessary applications, reduced leaching and reduced volatilization, and lower risk of burning which allows higher application rates.

Slowly Soluble

Slowly soluble nitrogen sources release nitrogen as their chemical structure slowly breaks down. Both natural and synthetic organic fertilizers can be classified as slowly soluble and are broken down by hydrolysis and/or microbial activity into soluble forms of nitrogen.

Natural organics include sewage sludge and plant and animal wastes, generally low in nutrient content.

Because of the bulk required to provide sufficient nutrients, and storage and odor problems, natural organics are being replaced by synthetic organic nitrogen in many fertilization programs. The most common synthetic organic nitrogen sources are ureaformaldehyde(UF) and isobutylidene diurea(IBDU).

> Soil analysis is not as useful in finding nitrogen deficiencies as observing symptoms.

UF Reaction Products

Ureaformaldehyde reaction products are synthesized by condensing urea with formaldehyde. From this reaction a number of urea-type compounds are produced; urea, methylol urea, and methylene urea. UF reaction products are distinguished from each other by the relative amounts of these three compounds and solubility in cold and hot water.

Most of the new fertilizer products are UF reaction products. To help identify types of UF reaction products scientists look at the number of carbon lengths in the chemical chain which results from condensing urea with formaldehyde.

Solubility of UF reaction products decreases, along with nitrogen release and burn potential, as the number of carbon lengths increase. Urea contains the least number of carbon lengths and methylene urea contains the largest number. Methylol ureas fall in between.

Ureaformaldehyde(Nitroform), a product of BFC Chemicals, Inc., contains at least 35 percent nitrogen, mostly in insoluble and slowly soluble forms. At least 60 percent of the total nitrogen of UF is insoluble in cold water.

Hawkeye's Formolene and Georgia Pacific's GP4341 are two liquid products which contain soluble methylol urea as the UF compound. C.P. Chemical's Nitro-26 Plus is also a liquid, but methylene urea is the predominant urea compound. Cleary's Fluf is a flowable liquid(a liquid containing microfine particles) which contains methylene urea as the predominant UF compound. Scott's Polyform is a homogeneous granular form of methylene ureas.

Knowledge of the relative amounts of urea, methylol urea, and methylene urea contained in liquid UF reaction products can be used as a guide in predicting their potential to cause fertilizer burn.

Fluf would have the least burn potential because it contains less than 16 percent urea with methylene urea as the predominant UF compound and 20 percent of the total nitrogen is water insoluble.

Nitro-26 Plus, like Fluf, also contains less than 16 percent urea with methylene urea as the major UF compound. However, Nitro-26 Plus contains no water insoluble nitrogen and therefore could be considered intermediate in burn potential.

Formolene and GP4341 contain 50 percent urea with methylol urea as the primary UF compound and would have the greatest potential to cause burn of the liquid UF reaction products.

IBDU

Isobutylidene diurea(IBDU) is produced by reacting urea with isobutyraldehyde and is marketed in two size ranges, fine (0.5-1.0 mm) and coarse (0.7-2.5 mm). Urea is released from IBDU through the hydrolytic action of water.

Factors which increase the rate of nitrogen release from IBDU include: 1) decreasing particle size, 2) increasing soil moisture, 3) increasing soil temperature,

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and 4) increasing soil acidity (lowering pH).

IBDU (Par-Ex) is sold by Estech General Chemical Corp. and contains 31 percent nitrogen which is 85 to 90 percent insoluble, depending upon particle size.

Slow-Release

Slow-release nitrogen is produced by encapsulating quick-release nitrogen with an insoluble coating. The soluble nitrogen is released through tiny pores as the coating is broken down in the soil. A mixture of variable coating thicknesses provides continuous release of soluble nitrogen for a controlled period of time. Only two slow-release nitrogen sources are commercially available—sulfur coated urea and Osmocote.

Sulfur-Coated Urea

Sulfur-coated urea is produced by coating urea with molten sulfur and then sealing the granule with oil or wax. The soluble nitrogen is released through tiny pores or imperfections in the coating.No two particles are coated the same.

The nitrogen release rate or dissolution rate is determined by placing sulfur-coated urea in water at 100 degrees F. for a seven-day period and is expressed as percent dissolved at the end of that time. Most SCU products have a dissolution rate between 20 and 30 percent. Factors which increase the release rate of nitrogen from SCU include: increasing soil temperature and increasing soil moisture.

Sulfur-coated urea is commercially available with 32 to 37 percent nitrogen from Canadian Industries Ltd., AG Industries Mfg. Corp.(a subsidiary of Lakeshore Equipment and Supply Co.), and O.M. Scott.

Osmocote

Osmocote is manufactured by encapsulating soluble fertilizer with a plastic, semiporous coating. Water enters the capsule, dissolves the nutrients, and then diffuses out into the soil for plant uptake. Osmocote is marketed by the Sierra Chemical Corp.

Quick Release

Quick-release nitrogen sources are all soluble in water and are either available for root uptake in their present form or are readily converted to available forms in the soil. Inorganic nitrogen fertilizers (do not contain carbon) such as ammonium nitrate and ammonium sulfate are quick-release. Urea, although technically an organic source of nitrogen, is soluble and possesses many of the same characteristics as the inorganics. Organic doesn't always mean slow-release.

FAN's nitrogen release is similar to urea, but its burn potential is much lower.

In general, the quickly available nitrogen sources are less expensive than controlled-release sources and have the following characteristics: 1) readily soluble in water, 2) immediately available for absorption, 3) can cause growth flushes, 4) short soil residual, 5) leach and/or volatilize, and 6) high burn potential,

Recent developments in ureaformaldehyde reaction products have provided quick-release nitrogen with a burn potential much lower than for other soluble nitrogen sources.

New Products

A newcomer to the soluble nitrogen market is avaible from the W.A. Cleary Co. as a liquid product under the name FAN. FAN contains 20 percent nitrogen and is produced by reacting urea and acid aldehyde to form ethylidene urea. Although the nitrogen release rate is similar to that of urea, the burn potential is much lower. The markets for FAN should be the same as for the sprayable UF reaction products.

Melamine (triaminotriazine) is a relatively new controlled-release nitrogen source produced by Melamine Chemicals, Inc. Melamine is combined with urea in 1/3(urea):2/3(melamine ratio by weight. It is marketed under the trade name Super 60, which has a 60-0-0 analysis.

Super 60 is currently sold for forest and rice fertilization and is being tested for the nursery and tree and turf care industries. It has a possible application in both the granular and liquid fertilizer markets since the granules disburse in water releasing urea into solution, while the melamine powder remains in suspension.

Melamine is very slowly broken down in the soil with an initial lag of more than 60 days before nitrification, followed by controlled release of nitrogen for a period of one to two years. Depending upon the results of further laboratory and field studies, melamine and/or various combination products may be available in the near future as an alternative to UF, IBDU, and SCU.

Phosphorus

Phosphorus is especially important in seedling growth. It is utilized in carbohydrate conversions, energy transfer, and is a component of nucleoproteins and phospholipids. Phosphorus helps maintain a desirable pH in cells and contributes to root development.

Phosphorus deficiencies are most often encountered in seedlings. Leaves or needles turn a dull green becoming reddish-bronze to purple, especially along margins in cold weather.

Some Phosphorus is provided by soil minerals and soil organic matter but it is very slowly available from these sources. Since phosphorus moves very little through soil, supplemental phosphorus tends to accumulate near the application site, moving only a few inches in 50 years.

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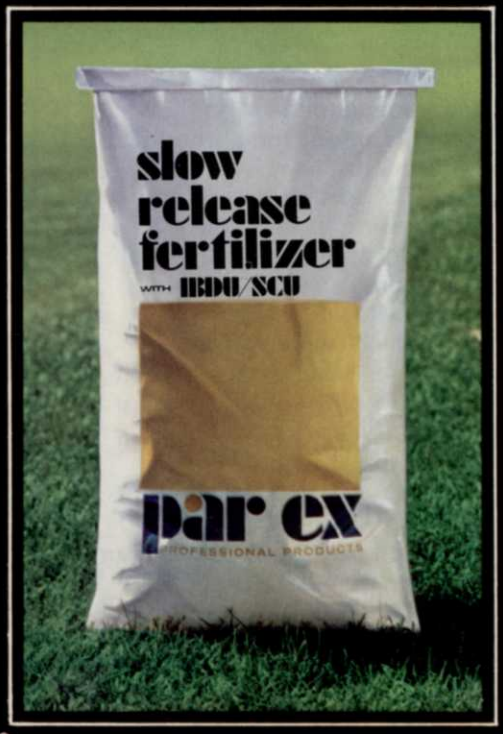

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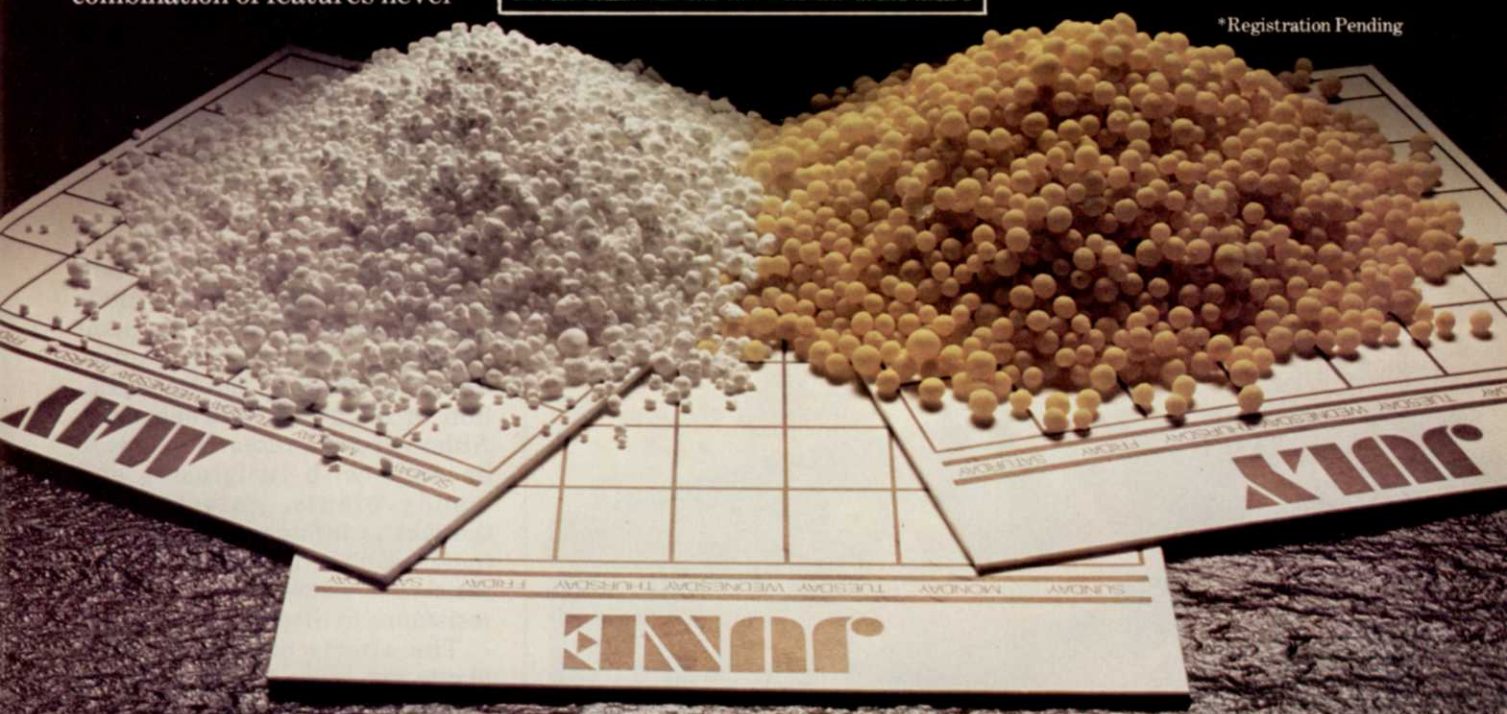

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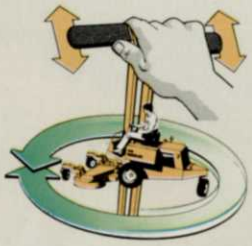

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Fertilizer

Plants take up phosphorus primarily in the orthophosphate form (H_2PO_4-). Although soils normally contain relatively large amounts of phosphorus, much of it is in forms not available to plants.

Phosphorus availabilty is influenced by soil pH. At a pH below 5.5, iron and aluminum form an insoluble complex with phosphorus that is not available to plants. At a pH above 7.5, calcium combines with phosphorus to form insoluble compounds such as calcium phosphate. Phosphorus is most available between pH 6.0 and 7.0.

The most common phosphorus sources for granular application are the superphosphates with a P_2O_5 equivalent of 20 to 48 percent.

Soluble phosphorus sources include monoammonium phosphate (11-48-0), recommended for alkaline soils, and diammonium phosphate (18-46-0).

Liquid ammonium phosphate (10-34-0) is often used where bulk tank storage is feasible. Monopotassium phosphate (0-52-34), a soluble, granular product, has an excellent potential as fertilizer because of its high analysis and low salt index. High cost of production has limited its use.

Potassium

Potassium is found in all plant parts in relatively large quantities and functions in catalyzing plant reactions, regulating transpiration, and aiding in the translocation of materials between cells. Although more research needs to be done with turfgrasses and woody plants, potassium is thought to influence rooting and increase heat, cold and drought resistance as well as enhancing resistance to disease.

The effects of potassium on plants are more subtle than the effects of nitrogen because they are not normally expressed visually in terms of growth rate or leaf color. Potassium deficiencies may restrict the translocation of car-

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Fertilizer

bohydrates and nitrogen metabolism and are evidenced first as marginal and interveinal yellowing of older leaves. Leaf tips may roll, turn brown and wither. Growth is often stunted.

Potassium mobility in soils is less than that of nitrate but greater than that of phosphates. The available form of potassium(K^+) is strongly adsorbed by clay particles which prevents excessive leaching except on sandy soils.

> Iron is the micronutrient most likely to be deficient in much of the U.S.

The most common potassium fertilizer is potassium chloride(0-0-62), although potassium sulfate(0-0-14) is often used in arid regions where chloride is a problem or in commercial lawn care programs because of its lower burn potential.

Potassium sulfate has a lower solubility and may contain insoluble silica fractions. Potassium nitrate(13-0-44) is an excellent fertilizer but generally is not priced competitively with the chloride or sulfate forms. Monopotassium phosphate(0-52-34), as mentioned earlier, has excellent potential as a fertilizer but its use is limited because of its high cost.

Iron

Deficiencies of micronutrients such as iron, zinc, manganese, copper and boron are sometimes found in certain plant species, especially when grown in alkaline or sandy soils. Iron is the micronutrient most likely to be deficient throughout much of the United States and Canada.

Iron is essential for the formation of chlorophyll and its deficiency is initially expressed as interveinal and marginal yellowing of the youngest leaves. Prolonged iron deficiency can result in decreased shoot and root growth because of a lack of chlorophyll to maintain photosynthesis.

Iron deficiencies do not usually result from a lack of iron but rather because the iron is tied up or "fixed" in insoluble compounds. Iron is most commonly deficient in alkaline soils although excessive levels of phosphate, manganese, zinc, and copper can produce iron deficiency. Waterlogged soils can also reduce the availability of iron.

Since iron deficiency is often the result of alkaline soil reactions, acidifying soils would appear to be a practical solution. Calcareous soils, however, may have large reserves of calcium to buffer attempts to lower the pH, particularly if the soil is fine textured. Relatively large amounts of sulfur may be required over a number of years to correct the pH of clay soils.

Compounds containing iron can be applied to the foliage, soil, or, for trees, injected or implanted into the trunk.

Materials for foliar and soil application include inorganic salts, such as ferrous sulfate and ferric nitrate, available from agricultural and horticultural distributors; and chelated forms, such as Sequestrene from Ciba Geigy and Ferriplex from Miller Chemical and Fertilizer Corp. An organic product called Eagle-Iron from Eagle-Picher Industries Inc., is effective for iron deficiencies in crops and is being tested for turfgrasses and woody plants.

Iron from inorganic salts is quickly combined into insoluble forms in alkaline soils and little remains available for plant use. Chelated irons react slower with soil components and improve the continued availability of iron.

For trunk injection or implantation of chlorotic trees, iron salts such as ferric citrate and ferric ammonium citrate are available from laboratory chemical distributors or may be ordered through a pharmacy. **WTT**

LANDSCAPE MANAGEMENT

Government Cutbacks Force Increased Efficiency

Park superintendent job grows as staff size and budgets shrink

By Maureen Hrehocik, associate editor

The economy has put a tight lid on government landscapers' budgets, and according to the results of a Weeds Trees & Turf survey, staff sizes have stayed the same or decreased.

The average budget for government maintenance in 1983 is $270,000, with an average $50,000 budget for landscape construction. The average staff size is 17.5, with number of personnel ranging from 1 to 175. "Our staff has been reduced to one-half its original size in 1975 through the attrition process. But the areas of responsibility and maintenance have increased," said one respondent. Another respondent said with the tight money situation, he will be feeling the effects for a "few more years, at least."

Fertilizers were the most frequently used chemical . . . followed by herbicides for turf weed control and herbicides for total vegetation control.

One park superintendent said his 1983-84 budget plan of attack will be greater use of chemicals, large mowing equipment, specialists, park planning, maintenance management, low-maintenance turf and computer use.

The majority of respondents were in supervisory positions and involved in municipal government landscape management of, on the average, 1,020 acres (50 under some form of irrigation). Those answering the survey came from a broad range of city, state, county and military landscape management, including school superintendents, grounds foremen, crew chiefs, park rangers, gardeners, airport managers and entomologists.

Most Important Areas of Work

1. Athletic Fields
2. Outdoor Building Maintenance
3. Park Maintenance
4. Tree Management
5. Snow Removal

Athletic fields, outdoor maintenance of buildings and park maintenance ranked among the most important areas of care for the respondents. Least important were military installations, cemeteries, golf courses, street and airport maintenance.

Most Common Types of Equipment Owned

1. Tractors
2. Small push mowers
3. Chain saws
4. Large riding mowers
5. Dump trucks

The most common type of machinery owned by managers were tractors, small push mowers, chain saws, large riding mowers, dump trucks, string trimmers and fertilizer chemical spreaders.

Most contract out tree trimming and plant and landscape installation . . .

Repairs are most frequently done by state, county or city service departments or city mechanics. Many repairs are done by the equipment operator.

A resounding majority of those who answered the questionaire were responsible for purchasing chemicals, seed and equipment for their agency or division, usually under bid. Most budget planning is done in February and March.

Fertilizers were the most frequently used chemical by a majority of the respondents, followed by herbicides for turf weed control and herbicides for total vegetation control. Few used growth regulators or wetting agents.

Trade magazines, publications and journals provide the primary source of information for new seed varieties, chemicals and equipment. Company sales reps, seminars and advertisments are

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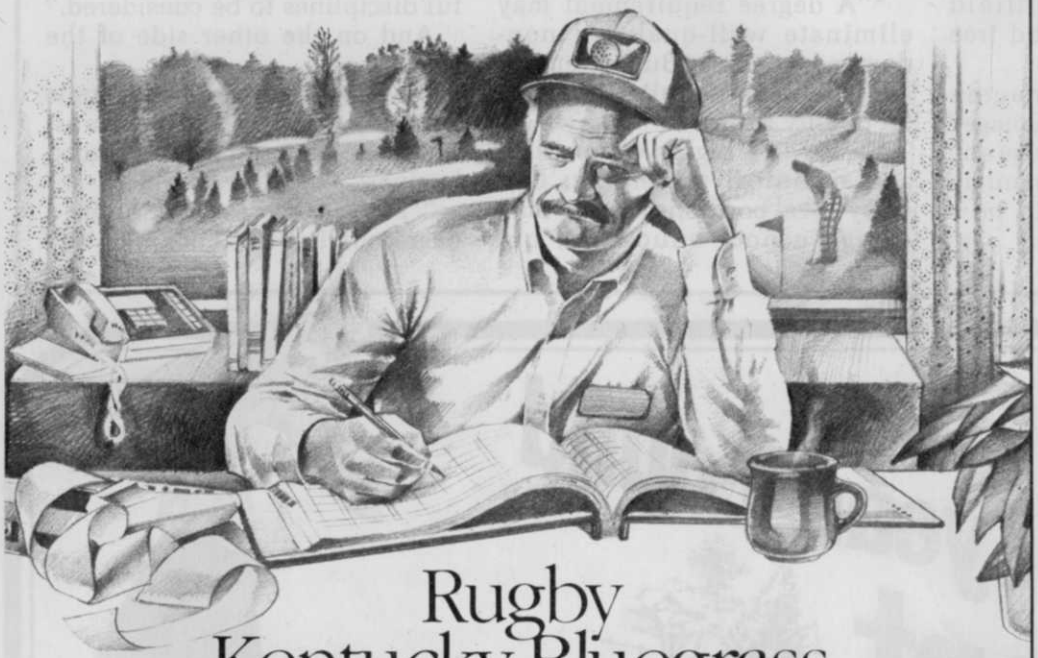

Rugby Kentucky Bluegrass grows rich on a lean budget.

Growing rich, green turf in today's economy is akin to being between a rock and a hard place.

Most Kentucky bluegrasses demand their fair share of nitrogen and water. But nitrogen and water, like the time needed to apply them, are money. And money is tight.

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For more information, write: Rugby, P.O. Box 923, Minneapolis, Minnesota 55440.

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CUTBACKS *from page 42*

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1. Fertilizers
2. Herbicides for turf weed control
3. Herbicides for total vegetation control
4. Tree Insecticides
5. Fungicides

also used to decide a maintenance program as well as purchases.

Most contract out tree trimming and plant and landscape installation as well as tree removal, grading, asphalt repair, ballfield dugouts, snow removal and tree moving.

Most landscape managers agreed the property they managed is in passable shape for its use and felt that major improvement in public landscaping would be a hard issue to sell to voters.

An almost equal split of respondents thought a degree was necessary to perform the duties of government landscape manager, while the other half thought it was unneccesary. Some of their thoughts:

*"We normally have too many other duties beside the care of the land. The persons hired by our school district learn from trial and error or from a salesman. We normally pay too low to hire professional employees."

*"It (degree) would be helpful to some degree, but my duties are so varied, the degree would be of limited benefit."

*"A degree requirement may eliminate well-qualified non-degreed persons. But extensive knowledge is definitely needed for quality results."

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An almost equal split of respondents thought a degree was necessary to perform the duties of government landscape manager, while the other half thought it was unnecessary.

And on the other side of the coin:

*"You deal with so many people from all walks of life you must know the material and be a good business executive as well."

"The ideal person is one with a degree AND experience." **WTT**

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Circle No. 109 on Reader Inquiry Card

LANDSCAPE MANAGEMENT

Salem Enlists Neighborhoods To Keep Park Budget in Line

Nineteen neighborhood groups help plant ivy in medians, pull weeds by hand, pick up litter, and plant trees.

Frank Bellinghausen, *parks superintendent for the City of Salem.*

By Maureen Hrehocik, associate editor

Dealing with cutbacks is part of life for Frank Bellinghausen. With a budget that has continually weathered cut after cut and a staff reduction of from 68 permanent employees six years ago to 45, the parks superintendent for the city of Salem, OR, was running out of ways to keep the quality of services he provided at an acceptable level.

One of the ways he decided to stem the tide of his ebbing budget, Bellinghausen's department became involved in the city's Self Help Project. The Project lets neighborhood groups get involved in the work of keeping their neighborhood in good shape. It saves the city time and some expense and offers the residents a quicker way of getting things done in their particular neighborhood.

This summer, Bellinghausen had three projects under way with four completed. Residents help with planting ivy in medians, hand weed pulling, planting trees and litter pick-up. Salem has 19 neighborhood associations.

"It has its problems, but it works," said Bellinghausen who endorses the project enthusiastically. "We live within the resources we have and where we can, we seek non-governmental support. We're reaching more and more to the volunteer aspect."

After a neighborhood's proposal is accepted by city council, the city provides the funds and the neighborhood provides the labor.

Working with and within a combined city and county $1,900,000 parks' budget consumes much of Bellinghausen's time. (Another $100,000 to $200,000 is budgeted for construction.) He admits budget bureacracy can be time consuming and tiresome. All budgeting is done through the city's budget

Tree trimming *and shredding in one of Salem's many city parks.*

committee, composed of 9 city council members and an equal number of citizens.

"There's a lot of red tape," Bellinghausen said. "I have to go through three budget committee hearings a year."

The department's greatest task is maintaining the turf and trees. In 1979, the department cared for 976 acres. This year that acreage has climbed to 1,644.

"We know how to do the work, but the budget curtails us," Bellinghausen said. "We have had no uniform application of herbicides for the past five years and have no budget for fertilizing in 1983. While the cutbacks continue, the demand and use of the turf in all areas is up. We can't reduce mowing any further without disturbing play."

The city has multi-use fields for baseball, softball and soccer and has a four-field softball complex in the middle of the fairgrounds. "When it gets to be state fair time, I have to schedule crews to go in and take down the backstops," Bellinghausen said.

Even with the cutbacks, Salem has had its share of recognition and awards, including being named Tree City, U.S.A. for the past seven years by the Arbor Foundation (The city of Salem alone has more than 60,000 street trees) and being named an All-American city for municipalities of its size for 1961 and 1983. "The city has done well to promote its parks with the resources it has," he said.

To make his division more efficient, Bellinghausen contracts out some of the maintenance on the older city parks so that his crew can handle the newer areas. He has developed a "program budgeting system" where the work areas in the city are divided up and cataloged so that an orderly and efficient maintenance schedule can be followed.

The city of Salem has neighborhood "mini-parks" which are usually small plots with play equipment on them. The larger community parks have regulation

A city worker *does edging around the Salem Civic Center.*

ball fields and in some cases, tennis courts. Large urban parks such as the Minto-Brown Island Park & Wildlife Refuge, only five minutes from the heart of downtown Salem, has jogging and bike trails and observation areas.

Bellinghausen has a serious erosion problem to deal with along the Willamette River in the refuge and will work with the Army Corps of Engineers to correct it.

"We are reaching more and more for volunteer help."

The equipment for the parks and recreation department is rented from a city equipment pool. In some cases, Bellinghausen has found it more cost and time efficient, rather than tying up his rented equipment, to contract out certain work such as mowing and tree trimming.

Manhattan ryegrass is predominant in the city's older parks. Now, Bellinghausen said, he uses a Derby/Manhattan mix. More than 400 acres are irrigated automatically.

He is also having a reoccurrence of Oak pit scale."Up until two years ago, we had it under control, then the budget was cut and we couldn't afford preventive maintenance anymore."

Bellinghausen has a parks supervisor who is responsible for the maintenance section and who oversees four foremen; and a Foreman II who heads the repair and construction section and also cares for three pools owned by the school district. Nine craftsmen work for him.

"A lot of my job is to pave the way for other people to get their jobs done," said Bellinghausen, referring to the governmental channels he must go through. But, he says, he is used to it and his past work experience shows it.

Prior to coming to Salem, Bellinghausen worked for 16 years for the State of California Department of Parks and Recreation. He was a park ranger and became the Statewide Ranger Training Coordinator at Asilamar, assisting in training all new park rangers in the state.

Besides working for the Forest Service, he was a State Parks Supervisor and an Area Manager. He has worked in Squaw Valley, Marin County, Samuel Taylor State Park, Point Reyes and was involved in the early stages of the Old Town San Diego State Historical Park renovation. In those 16 years, he made 13 household moves.

"It was just getting to be too much," he said, "and I wanted to get out of the law enforcement end of it."

When he came to Salem in 1972, he restructured the Parks Division. One month after he started his new job, he became involved in the Pacific Northwest Park and Recreation Management school. "My department has managed to meet the day-to-day challenges and avoid suffering too much," Bellinghausen explained. "We haven't had to run around and put out 'brush fires' because of the support of the community and elected officials." **WTT**

LANDSCAPE MANAGEMENT

The Commons *is a Number One priority area, receiving twice-a-week trimming and daily policing to keep up the Naval Academy's spic 'n span image.*

Sherman Wallace and Bill Cusimano *inspect the ornamental plantings at the Superintendent's Quarters on the academy campus, where visiting heads of state are entertained.*

Cusimano Navigates Protocol At U.S. Naval Academy Campus

Former landscaper scrambles to make 4,500 midshipmen, thousands of tourists, and visiting dignitaries feel at home.

By Kevin Cooney, assistant editor

The U.S. Naval Academy in Annapolis, MD., is not only a government reservation, but a university, tourist attraction and an athletic entity, according to Bill Cusimano, grounds maintenance manager. It is foremost a military base and operated like one.

Strolling through the tree-shaded central campus, one would believe this was another well-manicured Ivy League university until you notice the military statues and memorials that dot the landscape. Then come the plebes (freshmen) and midshipmen, strolling smartly along the red brick pathways in their crisp white uniforms.

Down by the harbor, rows of athletic fields line the sea wall while a few yards away the class of '87 clamber over the school fleet of training vessels, learning the basics of navigation and boat handling they will one day use to pilot destroyers, frigates and aircraft carriers through the world's waterways.

Cusimano ran his own general landscaping business for 19 years before he took over turf maintenance chores at the academy in 1978. He said he learned quickly government work means "you have the responsibility, but not the authority" to get the job done on time.

"When I ran my own business, my work crews had the authority to go out and buy the necessary tools to keep the job going. Here, I have to plan sometimes two months ahead to make sure we have what we need.

All equipment and tools at the academy are purchased by the General Services Administration, which determines what to buy based strictly on the lowest bid. "That way you get the cheapest, but not necessarily the best," he said.

Sherman Wallace, Annapolis' pest control foreman, noted that he can, and does, receive specific brands of fertilizers, fungicides and pesticides he requests. But he has to specify why a specific brand is more appropriate than others for individual jobs and meet state, naval and coastal regulators' requirements before he gets what he needs.

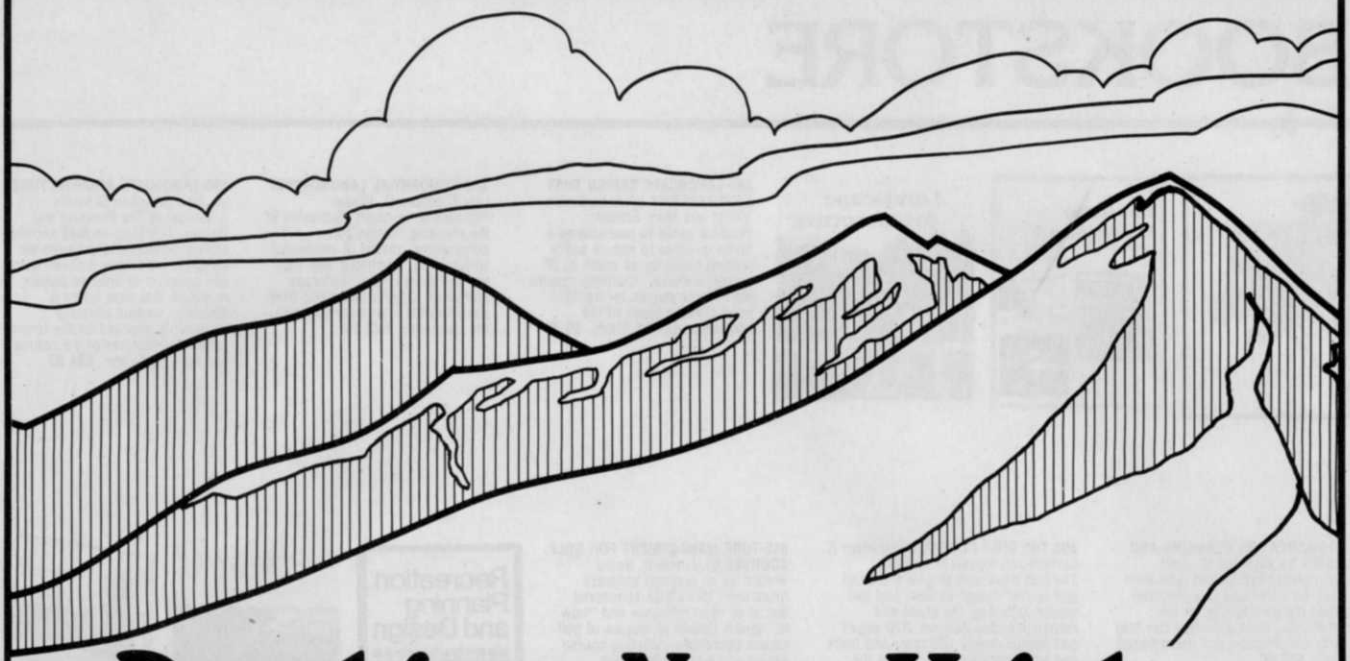
Trim areas are mowed with Jacobsen 20-inch rotaries, and the division's Woods rotary mowers handle the big areas towed behind John Deere or Massey-Ferguson tractors.

Jacobsen reel mowers are also in the academy's inventory. Hustler Excel riding rotary mowers round out the campus equipment.

Decentralization is so inherent in the management structure at Annapolis that Cusimano can't estimate his annual budget. Those figures are spread among the payroll, transportation, purchasing, personnel, housing, athletic and several other departments at the academy.

Occasionally, Cusimano will discover an outside contractor doing work on the grounds as he

Continued on page 54



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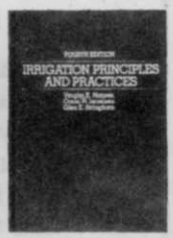

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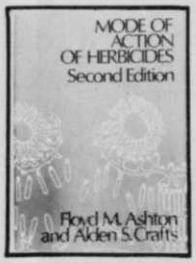

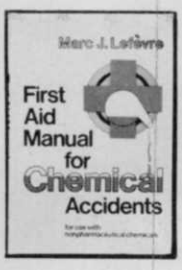

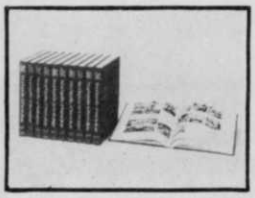

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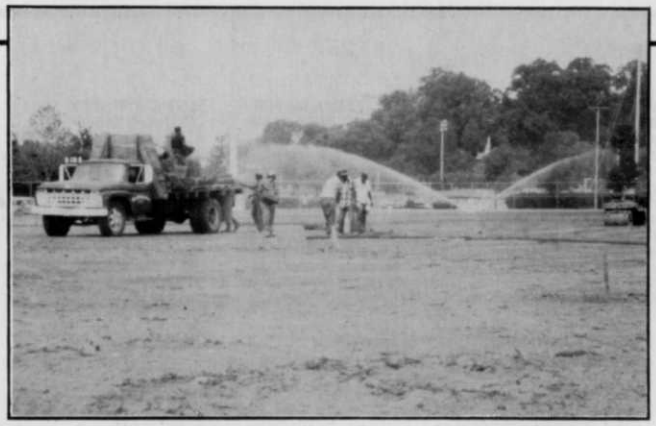

Outside Contractors *install new sod after raising the crown of one of the academy's intramural fields.*

Plebes pass *in front of Hospital Point, a 22-acre intramural field that was suffering from drought stress earlier this year. Cusimano overseeded that field with K-31 tall fescue.*

does his inspection rounds. Virtually all new plantings are handled through outside contracts. The Contracts Division will have arranged for the work, and because of the complex management structure and independence bred into the system, he said communication problems are a constant consideration.

Cusimano's equipment is bought through the GSA. The Ford, Chevrolet and Chrysler vehicles are allocated by the transportation division, and other tools are repaired by the mechanic's division. But irrigation equipment is repaired by the plumbing division.

"The biggest part of my job is salesman and diplomat, trying to convince the other departments that my job needs to be done first," he said.

In addition to the hodgepodge of offices he deals with on equipment matters, Cusimano's crews maintain everything from the garden at the superintendent's ceremonial quarters to apartment complexes, single-family homes, greenhouses, football and soccer fields, areas surrounding radio transmission towers and the academy burial grounds.

Visiting heads of state are entertained at the superintendent's quarters, sometimes on a moment's notice. The landscape there always has to be in top condition. The basement of the stately building houses a flower room where staffers can cut and arrange table decorations within hours of receiving word that a formal event will take place.

Officers, instructors and their families are housed in garden apartment complexes and single-family homes.There's the academy medical center and the cemetery where Annapolis graduates are entitled to be interred.

Then, of course, come the classrooms and laboratory buildings, including one area where Japanese pear trees were planted on the roof of an underground laboratory.

"I learned quickly you have the responsibility, but not the authority to get the job done on time."

"That presents a unique management problem," Cusimano said of the Japanese Pears. No irrigation system was installed to service the dozens of trees located on a concrete mall, and a wind shear coming from the bay through a tunnel created by two buildings means that planting has to be continually monitored to prevent any long-term damage.

Every one of the 4,500 midshipmen at Annapolis is required to engage in one sport during their four years. Every day at about 3:30, "the thundering herd," as Cusimano calls them, invade the 60 acres of intramural and practice fields near the waterfront. Because of rigid time schedules built into a military establishment, he has to adjust his maintenance schedules around the needs of the academic, athletic and military arms of the academy.

One Monday morning his staff overseeded the academy's parade grounds, the foreman said, and by Friday two practice sessions were held on the fledgling turf.

The "military lives by the clock—that's the tradition around here." When it comes to maintaining the athletic areas along the waterfront, soil characteristics present a special problem—those fields were built on top of land reclaimed from the Annapolis Harbor, "and it changes every ten feet - you might have some seabed, then construction fill that came from inland—it makes soil testing almost ludicrous," he commented.

This year Cusimano overseeded those athletic fields with a mix of 10 percent Cheri bluegrass and 90 percent Olympic tall fescue with good results. The non-athletic areas received a 30:30:30 mix of Pennant, Premier and Citation perennial ryegrasses with 10 percent Cheri.

Although he called the Annapolis area "the worst place in the world to grow grass—" it's located in the heart of the transition zone—Cusimano said he's pleased with the results of the overseeding and said the turf is in generally good shape throughout the academy.

Cusimano also instituted a full Par-Ex IBDU fertilizer program this year, but due to a month-long drought in July, he said it's going

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ANNAPOLIS *from page 54*

to be hard to judge the success of the program when he lays down fertilizer in late spring and mid-November.

To maintain the sprawling academy grounds efficiently with the staff of 70 full-time employees, Cusimano has five separate rating systems. Top priority are high-visibility areas, which are cut twice a week and policed daily. Number five areas, such as around the transmission tower complex and fuel storage tanks, receive occassional attention to minimize weeds and fire hazards.

The athletic areas are in a category by themselves and are maintained according to the needs of the various coaches and athletic department heads who use them. When it comes to chemical control of weeds, insects and fungi, Cusimano said he and Wallace, "go by bloom" when they schedule their pest applications.

"You can never schedule by the calender here," Cusimano said. "You get 100 degree days in April and snow flurries in May."

Wallace said he uses Roundup around the athletic areas, such as on the tartan racing tracks and under bleachers, as well as in all perennial areas throughout the 330-acre complex. He also applies it on the red brick walkways that wind through sections of the campus, as it doesn't stain the old brick as other non-selectives might.

To control white clover on the athletic fields, Wallace applies MCPP, and ornamental lawns are treated with non-volatile 2,4-D.

Dalapon is used for top burning on the waterfront areas, beneath bleachers and in combination with Simazine along fenceline. Orthene is the main insecticide used on the academy grounds, and Wallace said he applies Sevin for leaf chewers.

By combining post- and pre-emergents for fenceline control, Cusimano said his crews can treat those areas twice a year instead of four or five times as they did in the past.

Like many areas on the Eastern Seaboard, Annapolis is afflicted with Dutch Elm Disease. When an infestation is noted, Wallace's crews inject cups of Bidrin around the trunk." That shoots up to the leaves in a matter of hours," and quickly kills off that particular infestation, Cusimano said.

"It's a big problem, but we're holding the line" by using Arbotect 20S in a preventative program, Wallace commented.

Forty-five hundred cadets, their families, VIPs and almost-three million tourists visit Annapolis each year. There isn't any land bank for rotating use of the athletic fields, and new construction projects are always on the drawing board at the Naval Academy. By keeping on top of the myraid regulations, customers and departments at Annapolis, Cusimano keeps Annapolis both an institution and attraction.

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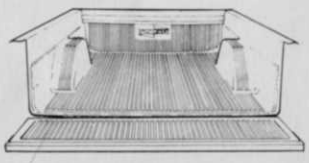

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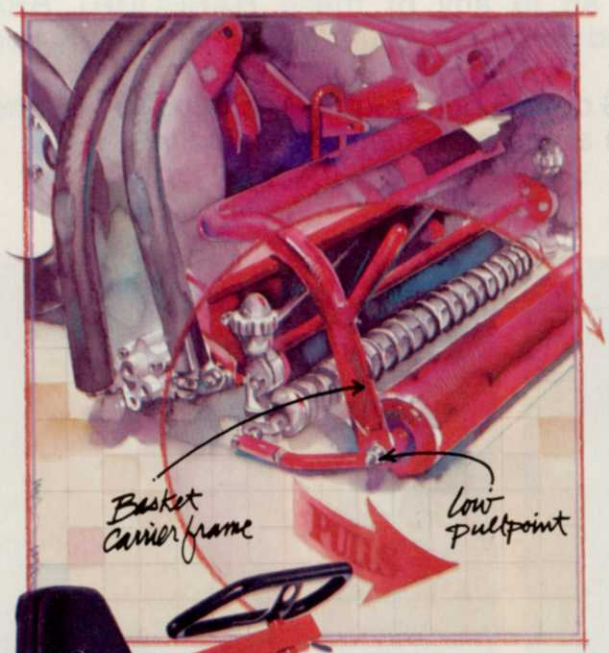

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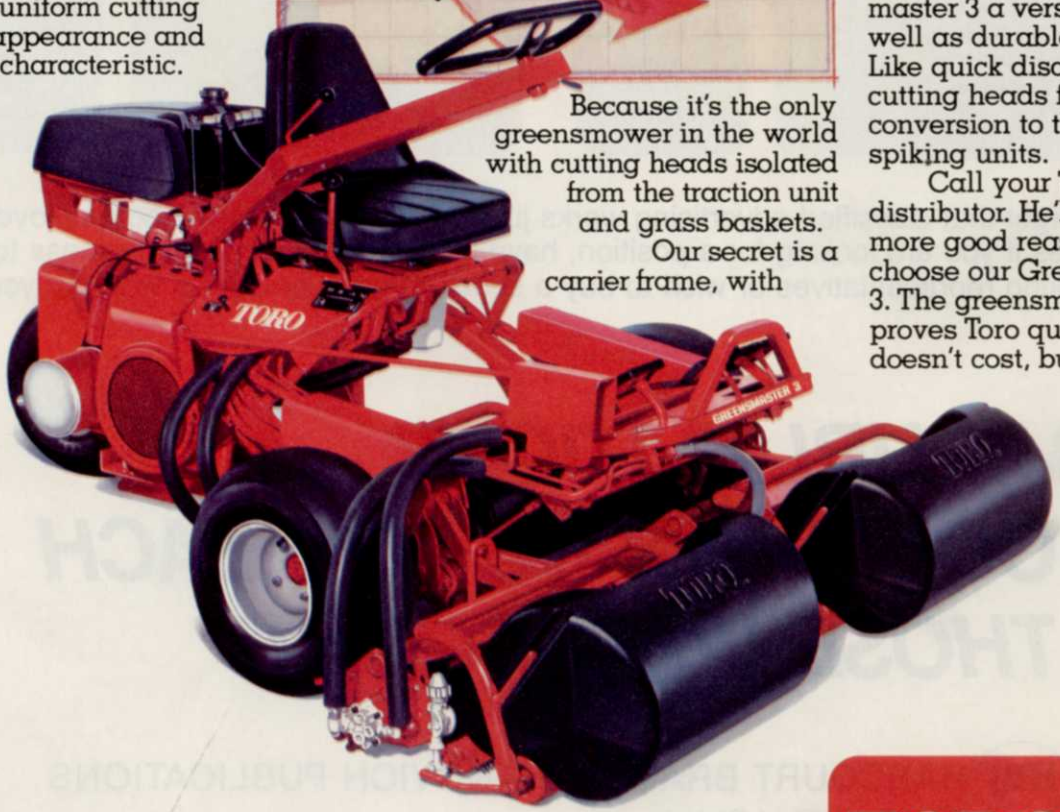

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Make your mower a marshmallow

Protect your trees from front-end mowers. Reducing mower-inflicted damage to trees, especially young specimens, is a continuing concern for grounds superintendents and horticulturists. While much research has been devoted to observing how a tree heals after wounding and applying preventative measures to the tree itself, an old tire and a couple of tools can turn your trunk-chopping mower into a marshmallow — almost.

Remove the side walls from an old, non-radial car or truck tire. Lay the inside of the tread against the steel guard of your mower that protects the cutting blades and drill 1/4-inch holes through the rubber and guards. But before drilling, be sure to position the holes above or below the cutting plane of the blades. Otherwise the bolt heads may hit the blades and ruin their edge.

Don't forget to place strips on the sides of your cutting guard too, as it doesn't always take a head-on collision to place a good gouge on the tree trunk.

Insert a bolt with the rounded head on the inside of the steel guard and attach the appropriate washers and screws. After tightening down the nut, cut off any excess bolt that protrudes beyond the nut and shave the end smooth.

To cover the nut, use epoxy glue - it can be purchased in ribbon-like form. After kneading the ribbon, you'll end up with a ball of putty-like material. Apply generously, and after hardening it will provide a durable shield between the bolt and tree trunks.

Don't forget to place strips on the sides of your cutting guard too, as it doesn't always take a head-on collision to place a good gouge on the trunk.

A quick coat of paint to match your mower, and your staff is ready to tackle those tight areas around trees with relative impunity.

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NOVEMBER

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Professional Grounds Management Conference and Trade Show, Cincinnati, OH. **Oct. 15-19.** Contact Alan Shulder, Executive Director, 7 Church Lane, Pikesville, MD. (301) 653-2742.

North Central Turfgrass Exposition, Arlington Park Hilton Hotel, Arlington Heights, IL. **Nov. 1-3.** Contact Dr. Thomas W. Fermanian, University of Illinois, 1060 Horticulture Field Lab, 1717 S. Orchard St., Urbana, IL, 61801. (217) 333-7847.

7th Annual Arizona Landscape Awards Program, Rio Rico Resort, Arizona. **Nov. 5.** Contact Dick Lambert, Arizona Landscape Contractors Association, P.O. Box 27312, Tempe, AZ 85282. (602) 968-8179.

1983 Oklahoma Turfgrass Conference and Trade Show. Nov. 14-16. Contact Dr. Robert L. Green, 360 Ag Hall, Stillwater, OK 74078. (405) 624-5414.

Greenhouse & Landscape Maintenance Conference, Salt Lake City Tri-Arc Travelodge. **Nov. 15-16.** Contact Dr. Dallas L. Holmes, Utah State University, UMC 50A, Logan, UT. 84322.

9th Annual Professional Landscape Management School, Indiana State University, Evansville, **Nov. 15-16.** Contact Allen Bober, Extension Agent, Horticulture Room 202, City-County Building, Evansville, IN, 47708.

Basic Personnel Management For the First Level Supervisor, sponsored by the Free State Branch, Professional Grounds Management Society. **Nov. 16,** Turf Valley Country Club, Ellicott City, MD. Contact Jeffrey A. Bourne, Howard County Recreation and Parks, 3430 Court House Drive, Ellicott City, Maryland, 21043. (301) 997-0714.

Arbor Expo, Philadelphia Civic Center, **Nov. 17-19.** Contact Daryl Komar, 17 Washington St., Norwalk, CT 06854. (203) 852-0500.

1983 American Society of Landscape Architects' Education Exhibit, Indianapolis, IN. **Nov. 19-21.** Contact Pam Nesmith, ASLA, 1733 Connecticut Ave. NW, Washington, D.C. 20009. (202) 466-7730.

Ohio Turfgrass Conference & Show, Cincinnati Convention & Exposition Center. **Dec. 6-8.** Contact John Street, OTF, 2021 Coffey Rd., Columbus, OH 43210. (614) 422-2601.

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Ford unveils five new compact loaders

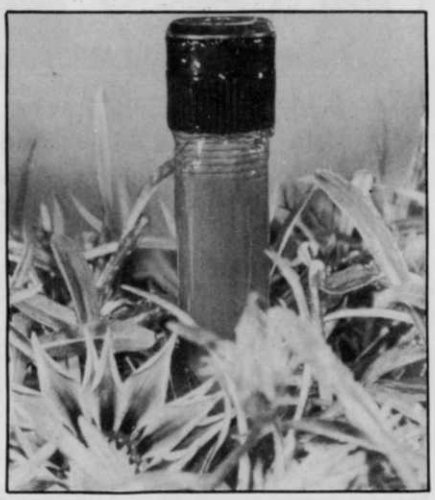
Five new compact Load Handlers are available from Ford that include diesel power, four-wheel hydrostatic drive and foot controls for the hydraulic-operated buckets. Ranging from Class II (700-900 lb. lift capacity)

to Class V (more than 1,750 lb. lift cap.), the new models and their classes are: The CL-25 (Class II) with 800-lb. rating and 20 HP engine, the CL-35 (Class III) with 1,000-lb. rating and 28-HP engine, the CL-45 (Class IV) with 1,300-lb. rating and 33 HP engine, the CL-55 (Class IV) with 1,700 lb. rating and 43-HP engine and the CL-65 (Class V) with 2,000-lb. rating and 62-HP engine. The CL-25 and CL-35 are also available with gasoline engines on special order.

Circle No. 150 on Reader Inquiry Card

Pressure compensated bubblers by Rain Bird

Low flow rates of .25, .50 and 1.00 gpm can now be maintained despite water pressure changes with the 1400 series Pressure Compensating Bubblers available from Rain Bird of Glendora CA. The bubblers are designed for localized irrigation of trees, shrubs and other small areas where precise watering is needed. The low flow rates and conventional installation features allow the bubbler to be used in many areas that were suited only for drip systems before.



Circle No. 151 on Reader Inquiry Card

Poast labeled for non-food crops

The EPA has given Poast post-emergent herbicide additional labeling to control grassy weeds in ornamentals, nursery stock and other non-food crops including Christmas trees. The BASF Wyandotte Corp. product can now be used to control annual and perennial grasses in azaleas, cotoneaster, flowering dogwood, euonymus, Frasier fir, forsythia, holly, juniper, Southern magnolia, red maple, willow oak, periwinkle, Eastern white pine, loblolly pine, mugho pine, Virginia pine, poplar, Norway spruce, white spruce and other plants. The herbicide enters

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grass plants through the foliage and translocates throughout the entire weed rapidly, but due to weather and other environmental factors it may take up to three weeks to see obvious symptoms of control. However, slowing or stopping of growth usually takes place within two days. Knapsack sprayers, high-volume equipment with spray guns and other ground equipment can be used to apply Poast.

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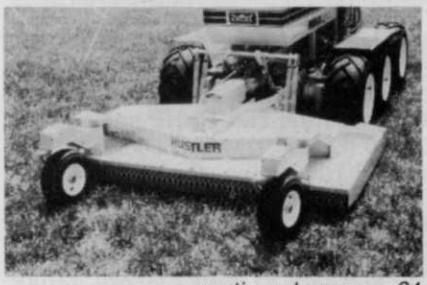
Dual trim decks for Excel Hustlers

A new 72-inch dual trim mowing deck for both rough and fine cut conditions is available for Hustler maintenance tractors from Excel Industries Inc.



continued on page 64

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Circle No. 153 on Reader Inquiry Card

Embark PGA label expanded

3M's Embark Plant Growth regulator is now approved for use on a wider range of ornamentals for control of Poa Annua seedhead development and spraying grasses around agricultural premises following EPA approval. Japanese ligustrum, pyracantha, English ivy and holly now can be treated with Embark, as well as 14 additional ornamentals in California. On golf course fairways, the herbicide can be applied at a 1/2 pint per-acre rate for control of Poa annua seedheads which strengthens root systems and enhances summer color and vigor.
Circle No. 154 on Reader Inquiry Card

New gearbox replaces Toro 690

The full-circle Model 10114 Gearbox from Royal Coach/Buckner is a two-nozzle impact drive sprinkler to replace the Toro 690 gearbox. An adjustable breakup pin on the drive nozzle reduces dry spots close to the head, while seven nozzle sizes with different volume and coverage patterns are available for special jobs. The 10114 has few moving parts and is made of heavy-duty bronze for long wear.

Circle No. 155 on Reader Inquiry Card

Marvik Aquaflow for ornamental pests

A new synthetic pyrethroid labeled to control aphids, thrips, whiteflies and leaf-eating caterpillers is available from Zoecon Corp. Marvik Aquaflow has been labeled for use on indoor and outdoor non-food ornamental crops and plantings, and shows good suppression of mites at the highest label rate. Applied as a full-coverage foliar spray, the water-based formulation should be used according to the severity of pest pressure or damage potential. Zoecon Products Manager Jim Heath said Marvik Aquaflow does not cause the mite flare problems other pyrethroids have shown because it does not affect most predators.
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J. Landon Reeve IV, President
Post Office Box 159
Woodbine, Maryland 21797
E O E

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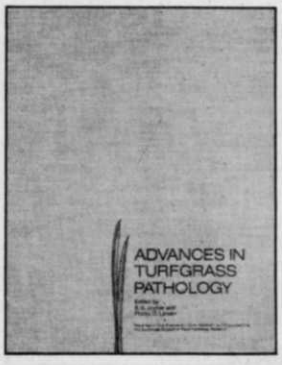

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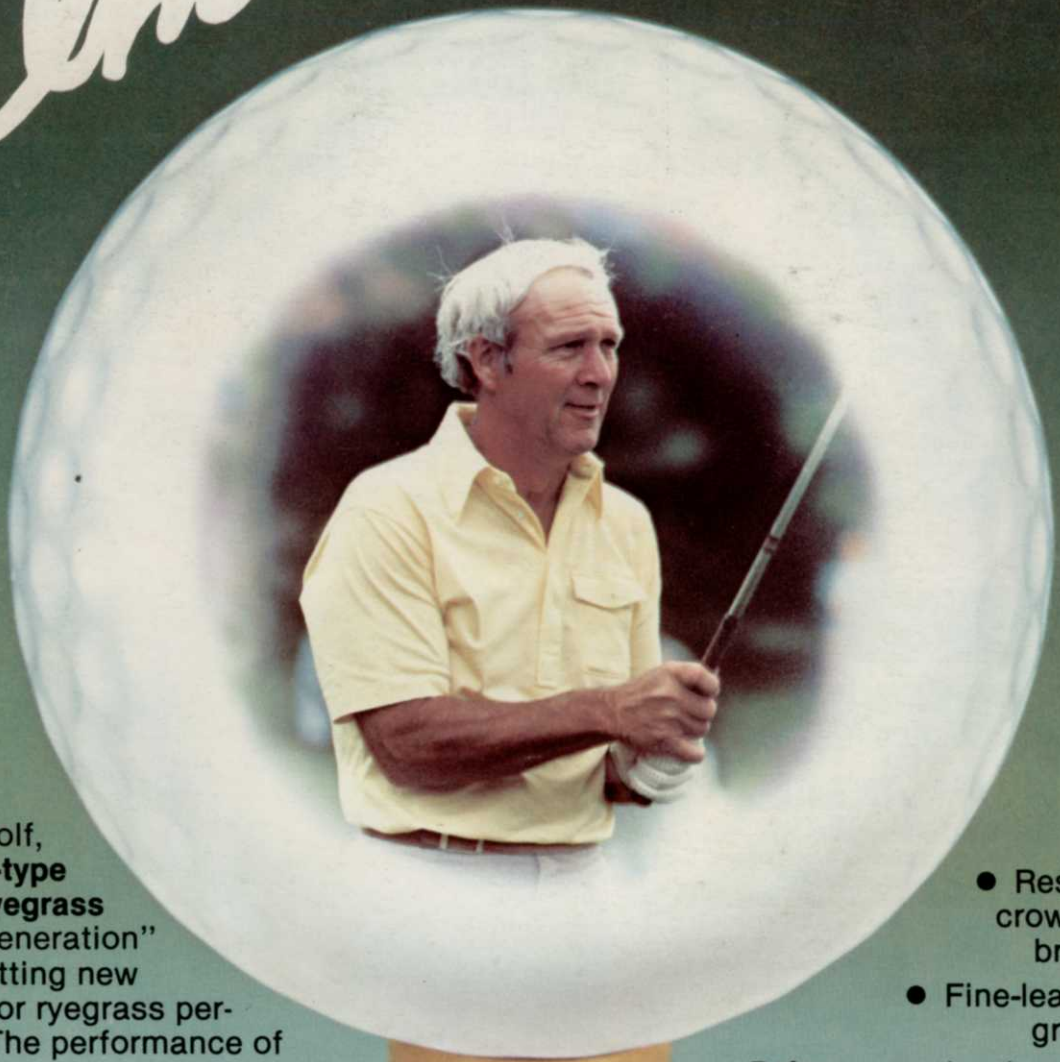

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